NAME: _____

Equations vs. Expressions

1) Mr. Stanton asked his students to write an algebraic expression on a piece of paper. He chose four students to go to the board and write their expression.

　　Robert wrote: $4(2x + 5) \geq 17$

　　Meredith wrote: $3y - 7 + 11z$

　　Steven wrote: $9w + 2 = 20$

　　Cynthia wrote: $8 + 10 - 4 = 14$

Which student wrote an algebraic expression?

(1) Robert　　　　　　　　(3) Steven

(2) Meredith　　　　　　　(4) Cynthia

2

2) An example of an algebraic expression is

(1) $\dfrac{2x + 3}{7} = \dfrac{13}{x}$　　　　　(3) $4x - 1 = 4$

(2) $(2x + 1)(x - 7)$　　　　(4) $x = 2$

2

3.) An example of an algebraic expression is

(1) $x + 2$　　　　　　　　(3) $y < x + 2$

(2) $y = x + 2$　　　　　　(4) $y = x^2 + 2x$

1

4.) An example of an algebraic expression is

(1) $y = mx + b$　　　　　(3) $2x + 3y \leq 18$

(2) $3x + 4y - 7$　　　　　(4) $(x + y)(x - y) = 25$

2

NAME: _____

Statistics

1) Which statement is true about the data set 3, 4, 5, 6, 7, 7, 10?

(1) mean = mode
(2) mean > mode
(3) mean = median
(4) mean < median

3

2) Alex earned scores of 60, 74, 82, 87, 87, and 94 on his first six algebra tests. What is the relationship between the measures of central tendency of these scores?

(1) median < mode < mean
(2) mean < mode < median
(3) mode < median < mean
(4) mean < median < mode

4

3) This year, John played in 10 baseball games. In these games he had hit the ball 2, 3, 0, 1, 3, 2, 4, 0, 2, and 3 times. In the first 10 games he plays next year, John wants to increase his average (mean) hits per game by 0.5. What is the total number of hits John needs over the first 10 games next year to achieve his goal?

(1) 5
(2) 2
(3) 20
(4) 25

4

4) Sam's grades on eleven chemistry tests were 90, 85, 76, 63, 94, 89, 81, 76, 78, 69, and 97. Which statement is true about the measures of central tendency?

(1) mean > mode
(2) mean < median
(3) mode > median
(4) median = mean

1

5) Given the following list of students' scores on a quiz: 5, 12, 7, 15, 20, 14, 7

Determine the median of these scores.

12

Determine the mode of these scores.

7

The teacher decides to adjust these scores by adding three points to each score. Explain the effect, if any, that this will have on the median and mode of these scores.

both by 3

6) The prices of seven race cars sold last week are listed in the table below.

Price per Race Car	Number of Race Cars
$126,000	1
$140,000	2
$180,000	1
$400,000	2
$819,000	1

What is the mean value of these race cars, in dollars?

315,000

What is the median value of these race cars, in dollars?

180,000

State which of these measures of central tendency best represents the value of the seven race cars. Justify your answer.

Median

7) Ms. Mosher recorded the math test scores of six students in the table below.

Student	Student Score
Andrew	72
John	80
George	85
Amber	93
Betty	78
Roberto	80

Determine the mean of the student scores, to the *nearest tenth*.

81.3

Determine the median of the student scores.

80

Describe the effect on the mean and the median if Ms. Mosher adds 5 bonus points to each of the six students' scores.

Mean = 86.3
Median = 85

NAME: _____

Box - and - Whisker

1.) The box-and-whisker plot below represents students' scores on a recent English test.

Student Scores
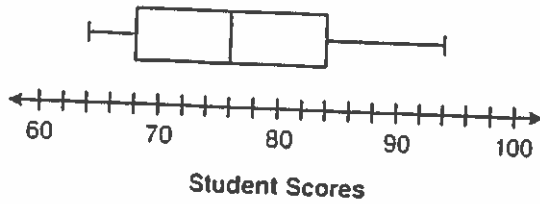
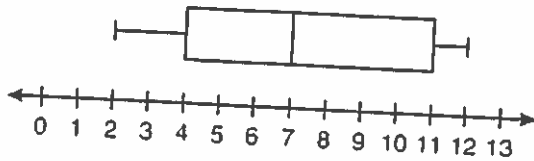What is the value of the upper quartile?

(1) 68   (3) 84

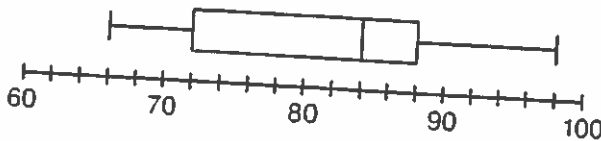(2) 76   (4) 94   3

2.) Based on the box-and-whisker plot below, which statement is *false*?

(1) The median is 7.

(2) The range is 12.   2

(3) The first quartile is 4.

(4) The third quartile is 11.

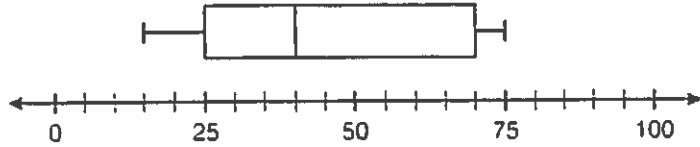The box-and-whisker plot below represents the math test scores of 20 students.

3.) What percentage of the test scores are *less than* 72?

(1) 25   (3) 75

(2) 50   (4) 100   1
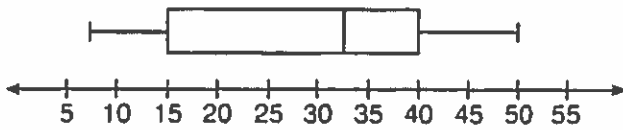
4.) What is the range of the data represented in the box-and-whisker plot shown below?

(1) 40

(3) 60

(2) 45

(4) 100

3

5) The box-and-whisker plot below represents the ages of 12 people.

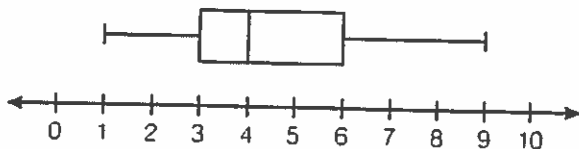
What percent of these people are age 15 or older?

(1) 25

(3) 75

(2) 35

(4) 85

3

6) A movie theater recorded the number of tickets sold daily for a popular movie during the month of June. The box-and-whisker plot shown below represents the data for the number of tickets sold, in hundreds.

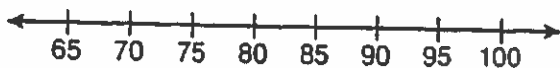Which conclusion can be made using this plot?

(1) The second quartile is 600.

(2) The mean of the attendance is 400.

(3) The range of the attendance is 300 to 600.

(4) Twenty-five percent of the attendance is between 300 and 400.

4

7) The test scores from Mrs. Gray's math class are shown below.

72, 73, 66, 71, 82, 85, 95, 85, 86, 89, 91, 92

Construct a box-and-whisker plot to display these data.

1st 72.5

Median 85

3rd 90

MAX 95

8) The number of songs fifteen students have on their MP3 players is:
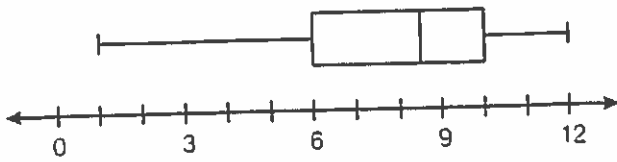120, 124, 132, 145, 200, 255, 260, 292, 308, 314, 342, 407, 421, 435, 452

State the values of the minimum, 1st quartile, median, 3rd quartile, and maximum.

Min = 12

1st = 145

Med = 292

3rd = 407

MAX = 452

Using these values, construct a box-and-whisker plot using an appropriate scale on the line below.

9) What is the value of the third quartile shown on the box-and-whisker plot below?

(1) 6

(3) 10

(2) 8.5

(4) 12

3

10.) The freshman class held a canned food drive for 12 weeks. The results are summarized in the table below.

Canned Food Drive Results

Week	1	2	3	4	5	6	7	8	9	10	11	12
Number of Cans	20	35	32	45	58	46	28	23	31	79	65	62

Which number represents the second quartile of the number of cans of food collected?

(1) 29.5

(3) 40

(2) 30.5

(4) 60

3

NAME: _____

Depreciation vs Apreciation

1.) Kathy plans to purchase a car that depreciates (loses value) at a rate of 14% per year. The initial cost of the car is $21,000. Which equation represents the value, v, of the car after 3 years?

(1) $v = 21,000(0.14)^3$

(3) $v = 21,000(1.14)^3$

(2) $v = 21,000(0.86)^3$

(4) $v = 21,000(0.86)(3)$

2

2) The Booster Club raised $30,000 for a sports fund. No more money will be placed into the fund. Each year the fund will decrease by 5%. Determine the amount of money, to the *nearest cent*, that will be left in the sports fund after 4 years.

24,435.19 or 24,435.20

3) The value of a car purchased for $20,000 decreases at a rate of 12% per year. What will be the value of the car after 3 years?

(1) $12,800.00

(3) $17,600.00

(2) $13,629.44

(4) $28,098.56

2

4) Mr. Smith invested $2,500 in a savings account that earns 3% interest compounded annually. He made no additional deposits or withdrawals. Which expression can be used to determine the number of dollars in this account at the end of 4 years?

(1) $2500(1 + 0.03)^4$

(3) $2500(1 + 0.04)^3$

(2) $2500(1 + 0.3)^4$

(4) $2500(1 + 0.4)^3$

1

5.) Cassandra bought an antique dresser for $500. If the value of her dresser increases 6% annually, what will be the value of Cassandra's dresser at the end of 3 years to the *nearest dollar*?

(1) $415

(3) $596

(2) $590

(4) $770

3

6) The value, y, of a $15,000 investment over x years is represented by the equation $y = 15000(1.2)^{\frac{x}{3}}$. What is the profit (interest) on a 6-year investment?

(1) $6,600

(3) $21,600

(2) $10,799

(4) $25,799

1

7) The current student population of the Brentwood Student Center is 2,000. The enrollment at the center increases at a rate of 4% each year. To the *nearest whole number*, what will the student population be closest to in 3 years?

(1) 2,240   (3) 5,488

(2) 2,250   (4) 6,240

2

8) A bank is advertising that new customers can open a savings account with a $3\frac{3}{4}\%$ interest rate compounded annually. Robert invests $5,000 in an account at this rate. If he makes no additional deposits or withdrawals on his account, find the amount of money he will have, to the *nearest cent*, after three years.

5,583.86

Function Determination

1.) Which statement is true about the relation shown on the graph below?
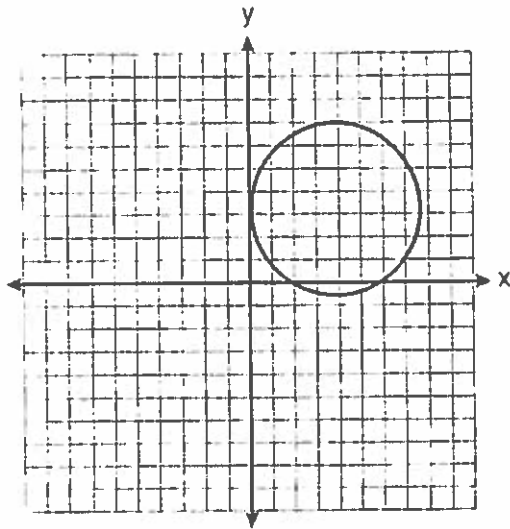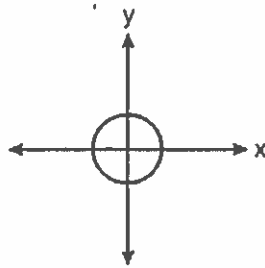

(1) It is a function because there exists one x-coordinate for each y-coordinate.

(2) It is a function because there exists one y-coordinate for each x-coordinate.

(3) It is *not* a function because there are multiple y-values for a given x-value.

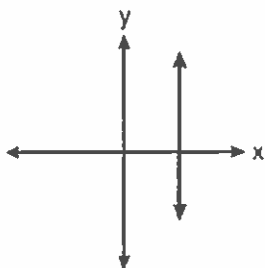(4) It is *not* a function because there are multiple x-values for a given y-value.
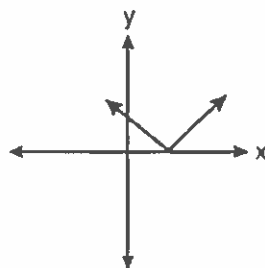
3

2) Which graph represents a function?

(1)

(3)

(2)

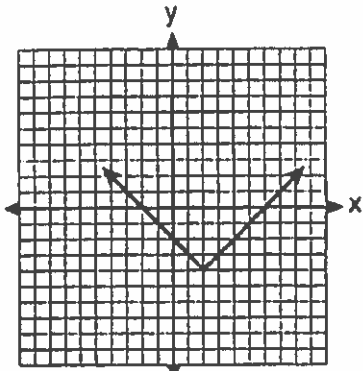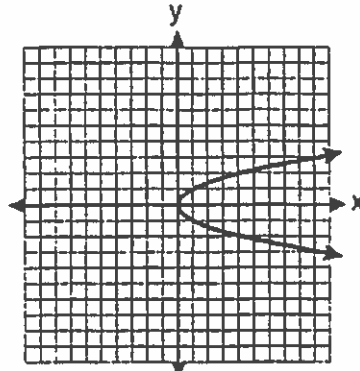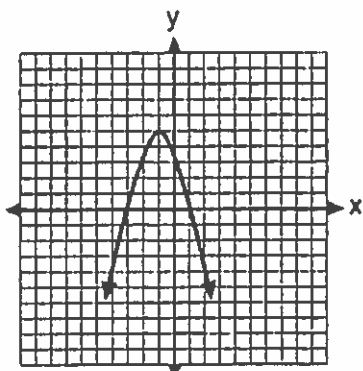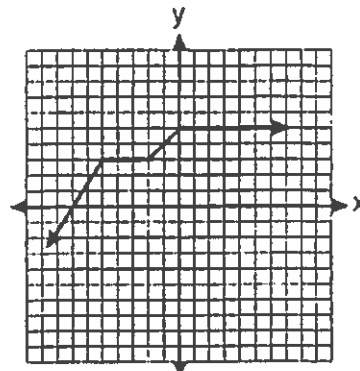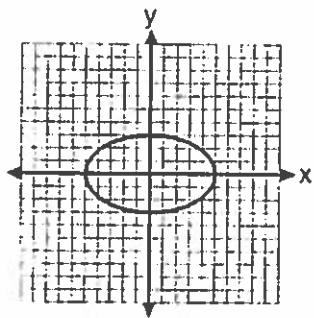

(4)
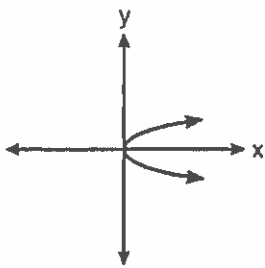
4

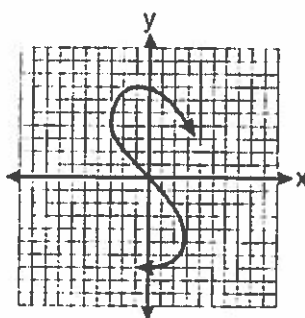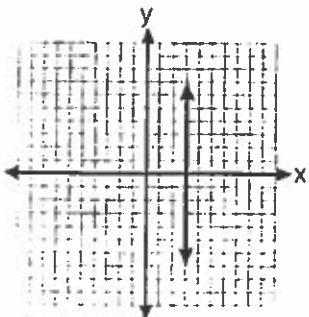3) Which graph does *not* represent a function?

(1)

(3)

(2)

(4)

4) Which graph represents a function?

(1)

(3)

(2)

(4)

3
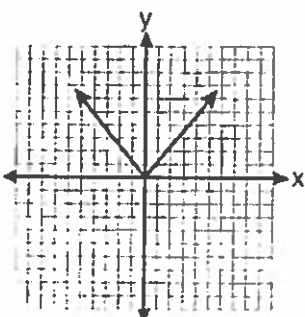
4

5) **Which relation is *not* a function?**

(1) {(1,5), (2,6), (3,6), (4,7)}

(2) {(4,7), (2,1), (−3,6), (3,4)}

(3) {(−1,6), (1,3), (2,5), (1,7)}

(4) {(−1,2), (0,5), (5,0), (2,−1)}

3

6) Which relation is a function?

(1) {($\frac{3}{4}$,0), (0,1), ($\frac{3}{4}$,2)}   (3) {(−1,4), (0,5), (0,4)}

(2) {(−2,2), (−$\frac{1}{2}$,1), (−2,4)}   (4) {(2,1), (4,3), (6,5)}

4

7) Which set of ordered pairs represents a function?

(1) {(0,4), (2,4), (2,5)}   (3) {(4,1), (6,2), (6,3), (5,0)}

(2) {(6,0), (5,0), (4,0)}   (4) {(0,4), (1,4), (0,5), (1,5)}

2

8) Which relation represents a function?

(1) {(0,3), (2,4), (0,6)}

(2) {(−7,5), (−7,1), (−10,3), (−4,3)}

(3) {(2,0), (6,2), (6,−2)}

(4) {(−6,5), (−3,2), (1,2), (6,5)}

4

NAME: _____

Causal, Bias, Qualitative vs Quantitative, Univariate vs Bivariate

1) A survey is being conducted to determine which types of television programs people watch. Which survey and location combination would likely contain the most bias?

   (1) surveying 10 people who work in a sporting goods store
   (2) surveying the first 25 people who enter a grocery store
   (3) randomly surveying 50 people during the day in a mall
   (4) randomly surveying 75 people during the day in a clothing store

   1

2) Erica is conducting a survey about the proposed increase in the sports budget in the Hometown School District. Which survey method would likely contain the *most* bias?

   (1) Erica asks every third person entering the Hometown Grocery Store.
   (2) Erica asks every third person leaving the Hometown Shopping Mall this weekend.
   (3) Erica asks every fifth student entering Hometown High School on Monday morning.
   (4) Erica asks every fifth person leaving Saturday's Hometown High School football game.

   4

3) A survey is being conducted to determine which school board candidate would best serve the Yonkers community. Which group, when randomly surveyed, would likely produce the most bias?

   (1) 15 employees of the Yonkers school district
   (2) 25 people driving past Yonkers High School
   (3) 75 people who enter a Yonkers grocery store
   (4) 100 people who visit the local Yonkers shopping mall

   1

4) A school wants to add a coed soccer program. To determine student interest in the program, a survey will be taken. In order to get an unbiased sample, which group should the school survey?

   (1) every third student entering the building
   (2) every member of the varsity football team
   (3) every member in Ms. Zimmer's drama classes
   (4) every student having a second-period French class

   1

5) Four hundred licensed drivers participated in the math club's survey on driving habits. The table below shows the number of drivers surveyed in each age group.

Ages of People in Survey on Driving Habits

Age Group	Number of Drivers
16–25	150
26–35	129
36–45	33
46–55	57
56–65	31

Which statement best describes a conclusion based on the data in the table?

(1) It may be biased because no one younger than 16 was surveyed.

(2) It would be fair because many different age groups were surveyed.

(3) It would be fair because the survey was conducted by the math club students.

(4) It may be biased because the majority of drivers surveyed were in the younger age intervals.

4

6.) Which set of data can be classified as qualitative?

(1) scores of students in an algebra class
(2) ages of students in a biology class
(3) numbers of students in history classes
(4) eye colors of students in an economics class

4

7) Which data set describes a situation that could be classified as qualitative?

(1) the ages of the students in Ms. Marshall's Spanish class
(2) the test scores of the students in Ms. Fitzgerald's class
(3) the favorite ice cream flavor of each of Mr. Hayden's students
(4) the heights of the players on the East High School basketball team

3

8) Which data set describes a situation that could be classified as qualitative?

(1) the elevations of the five highest mountains in the world
(2) the ages of presidents at the time of their inauguration
(3) the opinions of students regarding school lunches
(4) the shoe sizes of players on the basketball team

3

9) Which set of data can be classified as quantitative?

(1) first names of students in a chess club

(2) ages of students in a government class

(3) hair colors of students in a debate club

(4) favorite sports of students in a gym class

2

10) Which data set describes a situation that could be classified as quantitative?

(1) the phone numbers in a telephone book

(2) the addresses for students at Hopkins High School

(3) the zip codes of residents in the city of Buffalo, New York

(4) the time it takes each of Mr. Harper's students to complete a test

4

11) Which situation does *not* describe a causal relationship?

(1) The higher the volume on a radio, the louder the sound will be.

(2) The faster a student types a research paper, the more pages the paper will have.

(3) The shorter the distance driven, the less gasoline that will be used.

(4) The slower the pace of a runner, the longer it will take the runner to finish the race.

2

12) Which situation describes a correlation that is *not* a causal relationship?

(1) the length of the edge of a cube and the volume of the cube

(2) the distance traveled and the time spent driving

(3) the age of a child and the number of siblings the child has

(4) the number of classes taught in a school and the number of teachers employed

3

13) Which phrase best describes the relationship between the number of miles driven and the amount of gasoline used?

(1) causal, but not correlated

(2) correlated, but not causal

(3) both correlated and causal

(4) neither correlated nor causal

3

14) Which relationship can best be described as causal?

(1) height and intelligence

(2) shoe size and running speed

(3) number of correct answers on a test and test score

(4) number of students in a class and number of students with brown hair

3

15.) Which table does *not* show bivariate data?

(1)

Height (inches)	Weight (pounds)
39	50
48	70
60	90

(2)

Gallons	Miles Driven
15	300
20	400
25	500

(3)

Quiz Average	Frequency
70	12
80	15
90	6

(4)

Speed (mph)	Distance (miles)
40	80
50	120
55	150

3

16.) Which data table represents univariate data?

Side Length of a Square	Area of Square
2	4
3	9
4	16
5	25

(1)

Age Group	Frequency
20–29	9
30–39	7
40–49	10
50–59	4

(3)

Hours Worked	Pay
20	$160
25	$200
30	$240
35	$280

(2)

People	Number of Fingers
2	20
3	30
4	40
5	50

(4)

3

Rates of Change

1.) If the speed of sound is 344 meters per second, what is the approximate speed of sound, in meters per hour?

> 60 seconds = 1 minute
> 60 minutes = 1 hour

(1) 20,640

(3) 123,840

(2) 41,280

(4) 1,238,400

4

2.) It takes Tammy 45 minutes to ride her bike 5 miles. At this rate, how long will it take her to ride 8 miles?

(1) 0.89 hour

(3) 48 minutes

(2) 1.125 hours

(4) 72 minutes

4

3.) Nicole's aerobics class exercises to fast-paced music. If the rate of the music is 120 beats per minute, how many beats would there be in a class that is 0.75 hour long?

(1) 90

(3) 5,400

(2) 160

(4) 7,200

3

4.) A hiker walked 12.8 miles from 9:00 a.m. to noon. He walked an additional 17.2 miles from 1:00 p.m. to 6:00 p.m. What is his average rate for the entire walk, in miles per hour?

(1) 3.75

(3) 4.27

(2) 3.86

(4) 7.71

1

5.) What is the speed, in meters per second, of a paper airplane that flies 24 meters in 6 seconds?

(1) 144

(3) 18

(2) 30

(4) 4

4

6.) Steve ran a distance of 150 meters in $1\frac{1}{2}$ minutes. What is his speed in meters per hour?

(1) 6

(3) 100

(2) 60

(4) 6,000

4

7) The number of calories burned while jogging varies directly with the number of minutes spent jogging. If George burns 150 calories by jogging for 20 minutes, how many calories does he burn by jogging for 30 minutes?

(1) 100   (3) 200

(2) 180   (4) 225

4

8) The chart below compares two runners.

Runner	Distance, in miles	Time, in hours
Greg	11	2
Dave	16	3

Based on the information in this chart, state which runner has the faster rate. Justify your answer.

Greg

9) Angela wants to purchase carpeting for her living room. The dimensions of her living room are 12 feet by 12 feet. If carpeting is sold by the square yard, determine how many square yards of carpeting she must purchase.

3 feet = 1 yard
9 square feet = 1 square yard

16

10) A turtle and a rabbit are in a race to see who is first to reach a point 100 feet away. The turtle travels at a constant speed of 20 feet per minute for the entire 100 feet. The rabbit travels at a constant speed of 40 feet per minute for the first 50 feet, stops for 3 minutes, and then continues at a constant speed of 40 feet per minute for the last 50 feet.

Determine which animal won the race and by how much time.

Turtle .5

11) Tom drove 290 miles from his college to home and used 23.2 gallons of gasoline. His sister, Ann, drove 225 miles from her college to home and used 15 gallons of gasoline. Whose vehicle had better gas mileage? Justify your answer.

Ann

12) In a game of ice hockey, the hockey puck took 0.8 second to travel 89 feet to the goal line. Determine the average speed of the puck in feet per second.
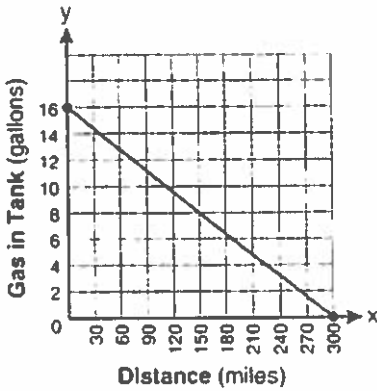
111.25

13) The gas tank in a car holds a total of 16 gallons of gas. The car travels 75 miles on 4 gallons of gas. If the gas tank is full at the beginning of a trip, which graph represents the rate of change in the amount of gas in the tank?
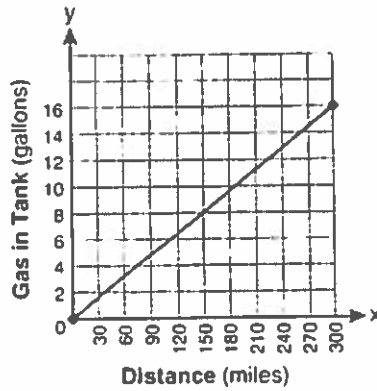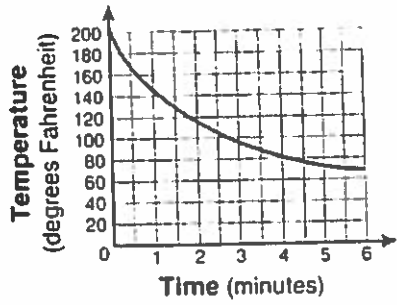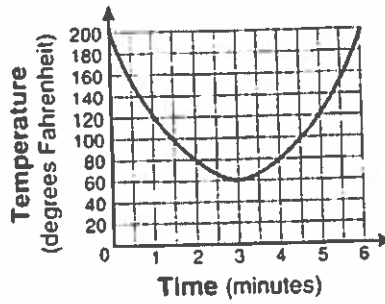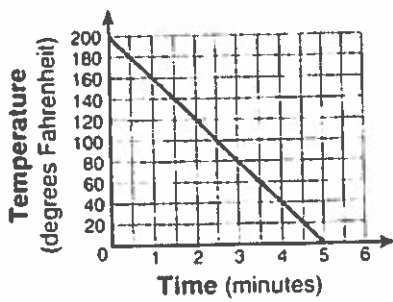

(1)

(3)

(2)

(4)

2
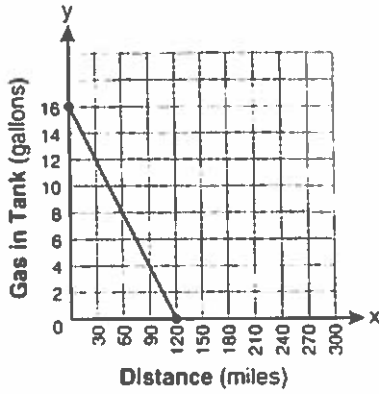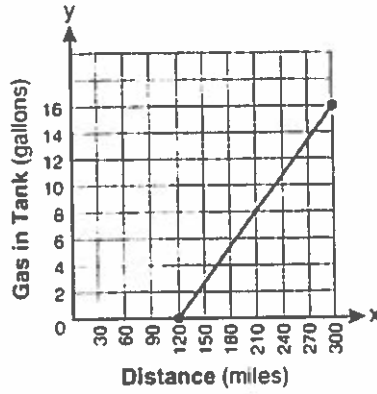
14) Antvaan leaves a cup of hot chocolate on the counter in his kitchen. Which graph is the best representation of the change in temperature of his hot chocolate over time?
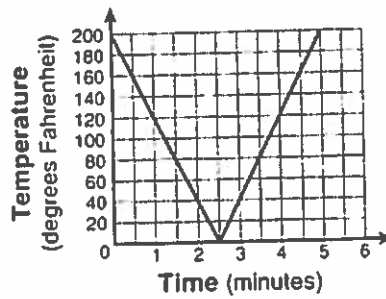

(1)

(3)

(2)

(4)

15) The table below represents the number of hours a student worked and the amount of money the student earned.

Number of Hours (h)	Dollars Earned (d)
8	$50.00
15	$93.75
19	$118.75
30	$187.50

Write an equation that represents the number of dollars, d, earned in terms of the number of hours, h, worked.

$$d = 6.25h$$

Using this equation, determine the number of dollars the student would earn for working 40 hours.

250

16) The Hudson Record Store is having a going-out-of-business sale. CDs normally sell for $18.00. During the first week of the sale, all CDs will sell for $15.00.

Written as a fraction, what is the rate of discount?

3/4

What is this rate expressed as a percent? Round your answer to the *nearest hundredth of a percent.*

16 ⅔ %

During the second week of the sale, the same CDs will be on sale for 25% off the *original* price. What is the price of a CD during the second week of the sale?
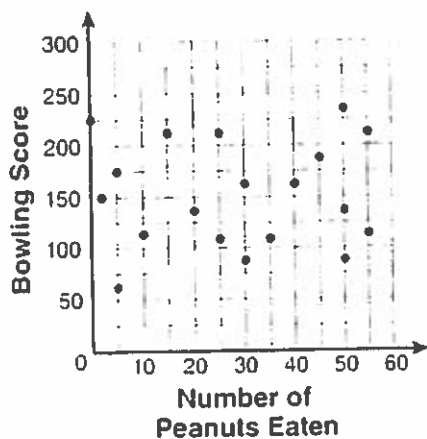
13.50

17.) Roberta needs ribbon for a craft project. The ribbon sells for $3.75 per yard. Find the cost, in dollars, for 48 inches of the ribbon.

5

Scatter Plot

The scatter plot below represents the relationship between the number of peanuts a student eats and the student's bowling score.

Which conclusion about the scatter plot is valid?

(1) There is almost no relationship between eating peanuts and bowling score.

(2) Students who eat more peanuts have higher bowling scores.

(3) Students who eat more peanuts have lower bowling scores.

(4) No bowlers eat peanuts.

What is the relationship between the independent and dependent variables in the scatter plot shown below?
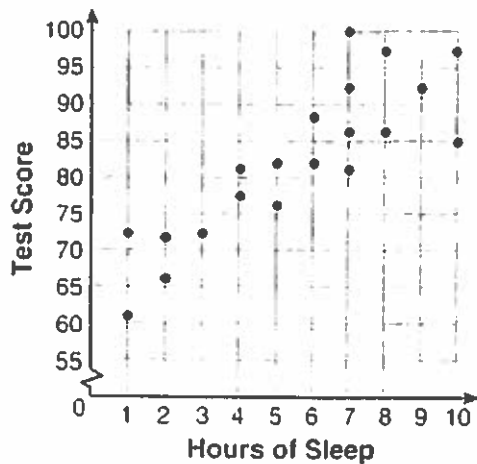
(1) undefined correlation   (3) positive correlation

(2) negative correlation   (4) no correlation

The number of hours spent on math homework each week and the final exam grades for twelve students in Mr. Dylan's algebra class are plotted below.
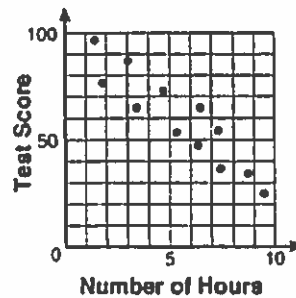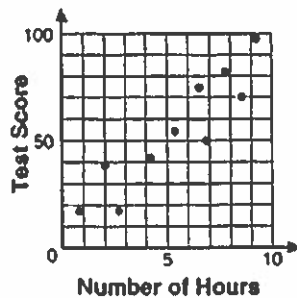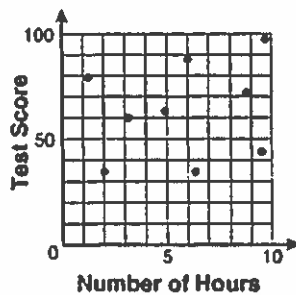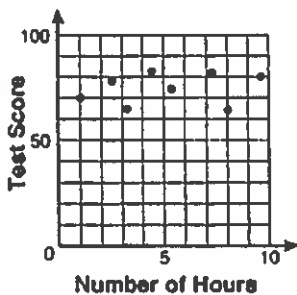
Mr. Dylan's Class
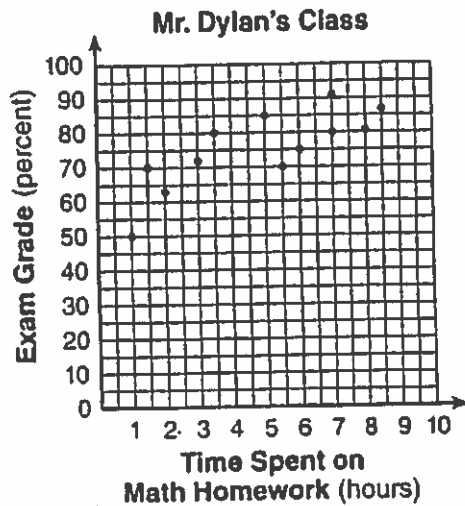
Based on a line of best fit, which exam grade is the best prediction for a student who spends about 4 hours on math homework each week?

(1) 62   (3) 82

(2) 72   (4) 92

There is a negative correlation between the number of hours a student watches television and his or her social studies test score. Which scatter plot below displays this correlation?
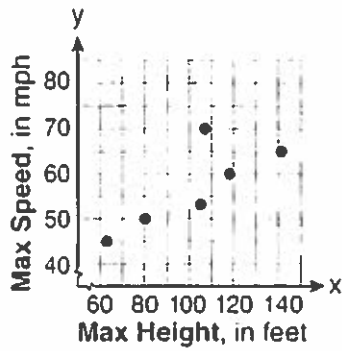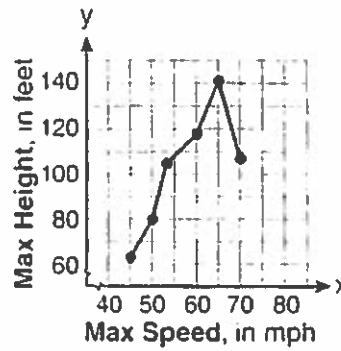

(1)

(3)

(2)

(4)

The maximum height and speed of various roller coasters in North America are shown in the table below.

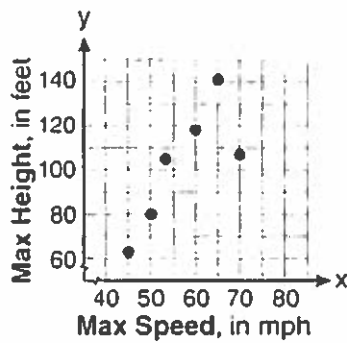| Maximum Speed, in mph, (x)	45	50	54	60	65	70
Maximum Height, in feet, (y)	63	80	105	118	141	107

Which graph represents a correct scatter plot of the data?

(1)

(3)

(2)
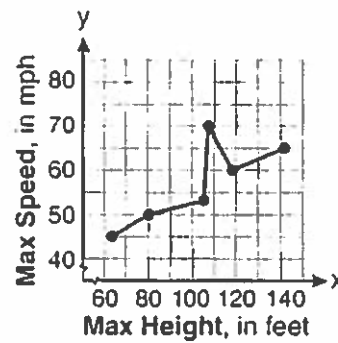
(4)

2

Which equation most closely represents the line of best fit for the scatter plot below?

Money Earned from Babysitting

(1) $y = x$

(2) $y = \frac{2}{3}x + 1$
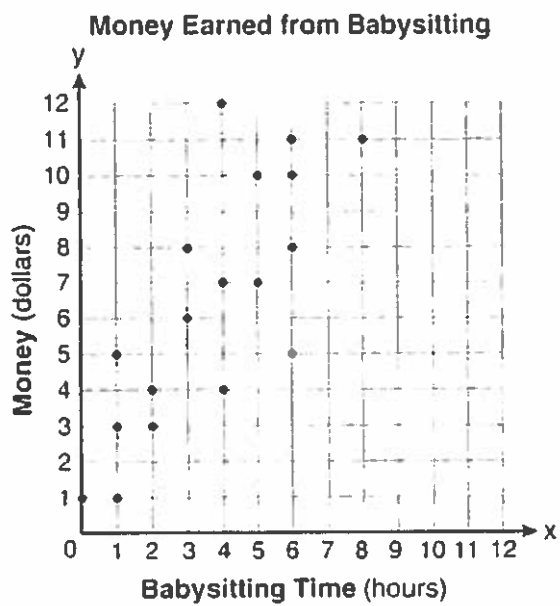
(3) $y = \frac{3}{2}x + 4$

(4) $y = \frac{3}{2}x + 1$

4/

Megan and Bryce opened a new store called the Donut Pit. Their goal is to reach a profit of $20,000 in their 18th month of business. The table and scatter plot below represent the profit, P, in thousands of dollars, that they made during the first 12 months.

| t (months)	1	2	3	4	5	6	7	8	9	10	11	12
P (profit, in thousands of dollars)	3.0	2.5	4.0	5.0	6.5	5.5	7.0	6.0	7.5	7.0	9.0	9.5

Donut Pit Profits
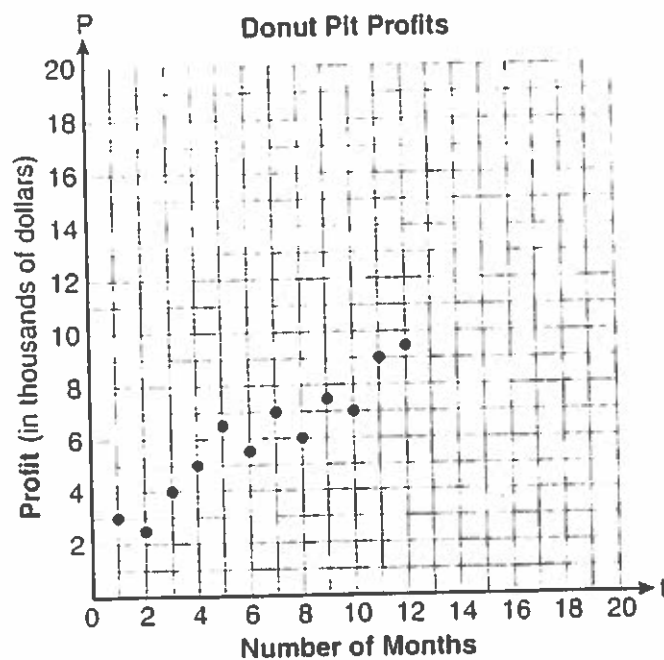

Draw a reasonable line of best fit.

Using the line of best fit, predict whether Megan and Bryce will reach their goal in the 18th month of their business.

Justify your answer.

Which scatter plot shows the relationship between x and y if x represents a student score on a test and y represents the number of incorrect answers a student received on the same test?

Number of Incorrect Answers

Test Scores

(1)

Number of Incorrect Answers

Test Scores

(3)

Number of Incorrect Answers

Test Scores

(2)

Number of Incorrect Answers

Test Scores
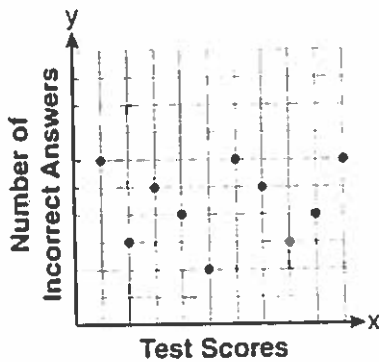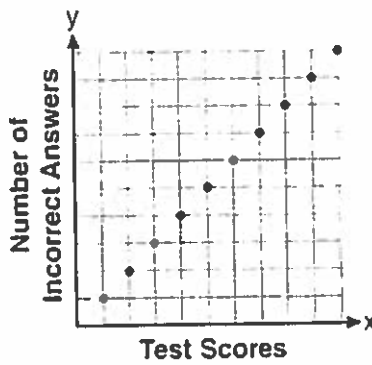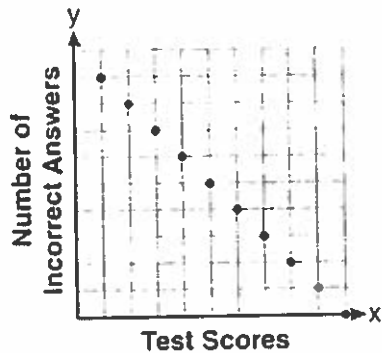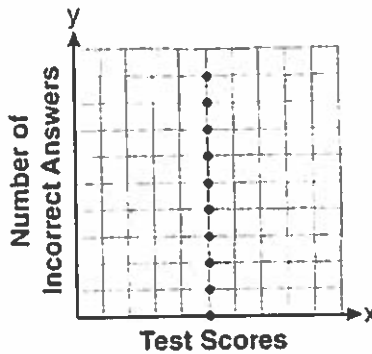
(4)

2

In a linear equation, the independent variable increases at a constant rate while the dependent variable decreases at a constant rate. The slope of this line is

(1) zero

(2) negative

(3) positive

(4) undefined

2

The school store did a study comparing the cost of a sweatshirt with the number of sweatshirts sold. The price was changed several times and the numbers of sweatshirts sold were recorded. The data are shown in the table below.

Cost of Sweatshirt	$10	$25	$15	$20	$5
Number Sold	9	6	15	11	14

Which scatter plot represents the data?

(1)

(3)

3

(2)

(4)
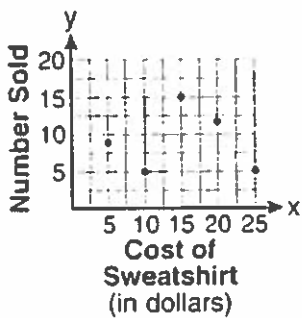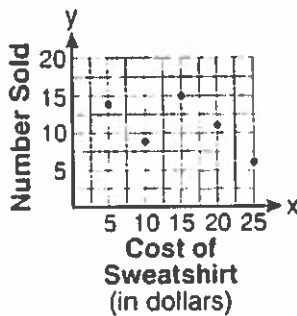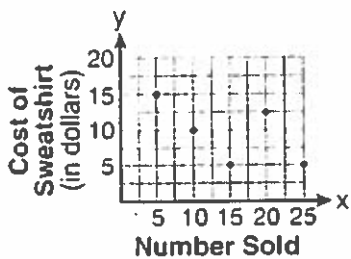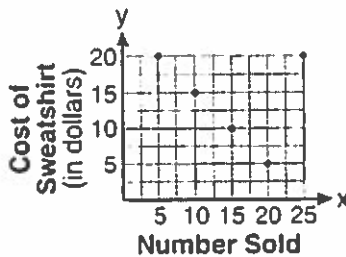
The table below shows the number of prom tickets sold over a ten-day period.

Prom Ticket Sales

Day (x)	1	2	5	7	10
Number of Prom Tickets Sold (y)	30	35	55	60	70

Plot these data points on the coordinate grid below. Use a consistent and appropriate scale. Draw a reasonable line of best fit and write its equation.

Prom Ticket Sales

Day
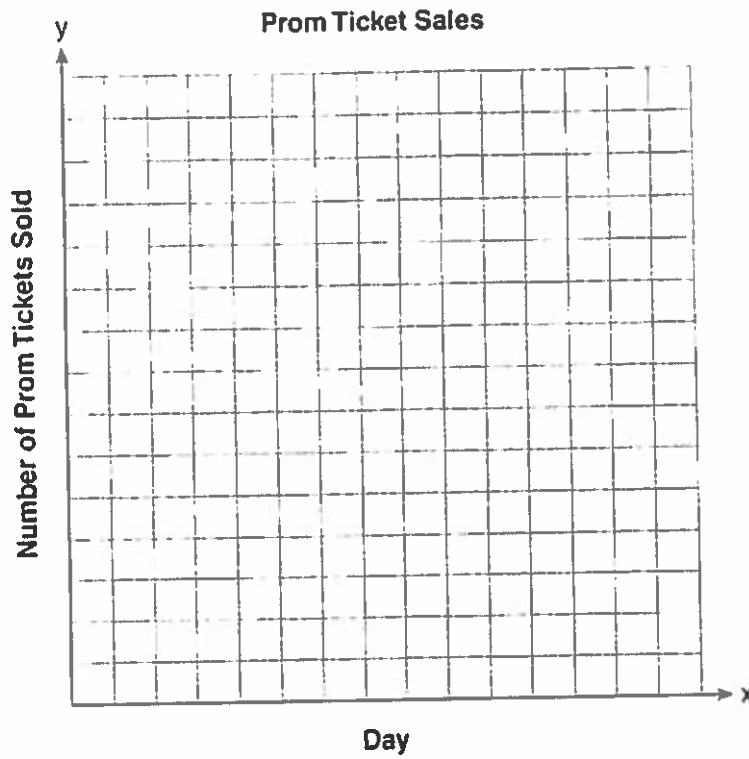
NAME: _____

Histograms

1) The table below shows a cumulative frequency distribution of runners' ages.

**Cumulative Frequency Distribution
of Runners' Ages**

Age Group	Total
20–29	8
20–39	18
20–49	25
20–59	31
20–69	35

According to the table, how many runners are in their forties?

(1) 25   (3) 7

(2) 10   (4) 6   3

2) Ms. Hopkins recorded her students' final exam scores in the frequency table below.

Interval	Tally	Frequency
61–70	ℍℍ	5
71–80	IIII	4
81–90	ℍℍ IIII	9
91–100	ℍℍ I	6

On the grid below, construct a frequency histogram based on the table.
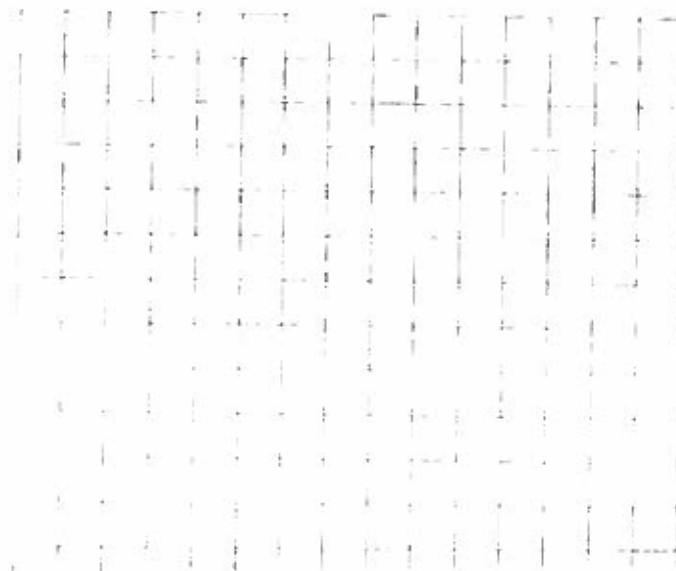
3) The test scores for 18 students in Ms. Mosher's class are listed below:

86, 81, 79, 71, 58, 87, 52, 71, 87, 87, 93, 64, 94, 81, 76, 98, 94, 68

Complete the frequency table below.

Interval	Tally	Frequency
51–60		
61–70		
71–80		
81–90		
91–100		

Draw and label a frequency histogram on the grid below.
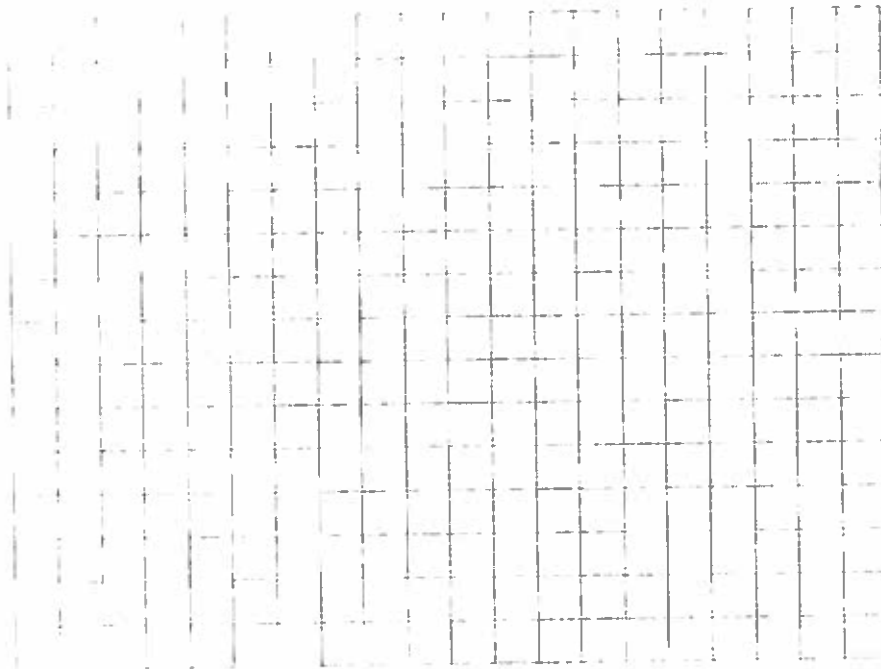
4) The Fahrenheit temperature readings on 30 April mornings in Stormville, New York, are shown below.

41°, 58°, 61°, 54°, 49°, 46°, 52°, 58°, 67°, 43°, 47°, 60°, 52°, 58°, 48°,

44°, 59°, 66°, 62°, 55°, 44°, 49°, 62°, 61°, 59°, 54°, 57°, 58°, 63°, 60°

Using the data, complete the frequency table below.

Interval	Tally	Frequency
40–44		
45–49		
50–54		
55–59		
60–64		
65–69		

On the grid on the next page, construct and label a frequency histogram based on the table.
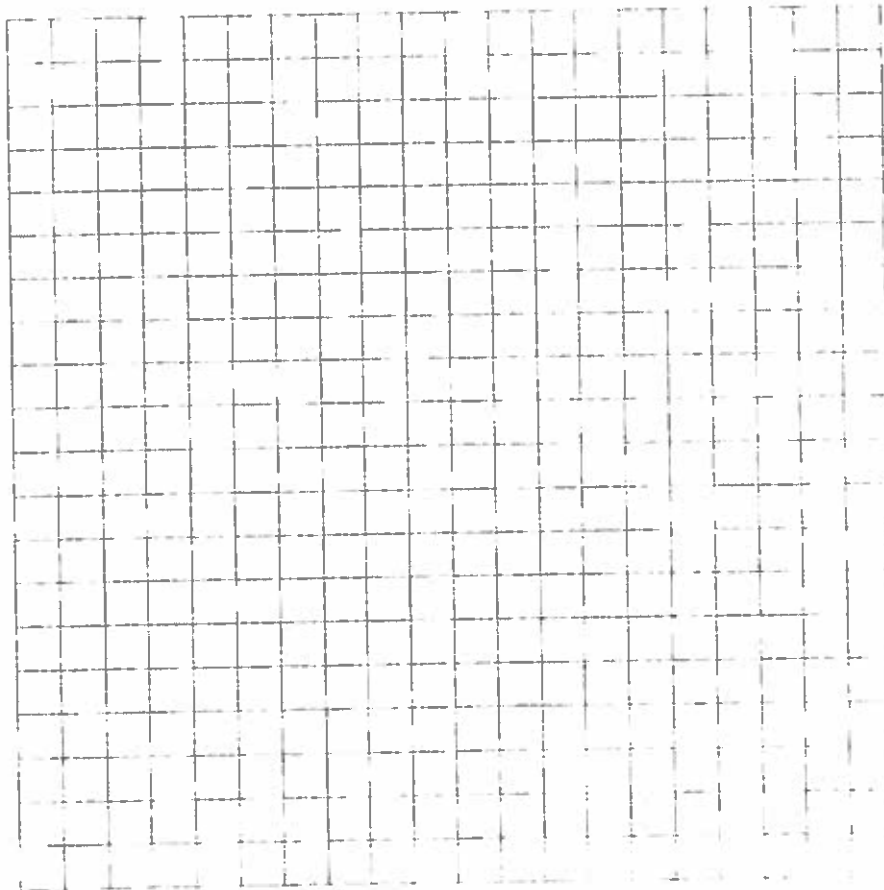
5) Twenty students were surveyed about the number of days they played outside in one week. The results of this survey are shown below.

{6, 5, 4, 3, 0, 7, 1, 5, 4, 4, 3, 2, 2, 3, 2, 4, 3, 4, 0, 7}

Complete the frequency table below for these data.

Number of Days Outside

Interval	Tally	Frequency
0–1		
2–3		
4–5		
6–7		

Complete the cumulative frequency table below using these data.

Number of Days Outside

Interval	Cumulative Frequency
0–1	
0–3	
0–5	
0–7	

This question continues on the next page.

Question 38 continued

On the grid below, create a cumulative frequency histogram based on the table you made on the previous page.
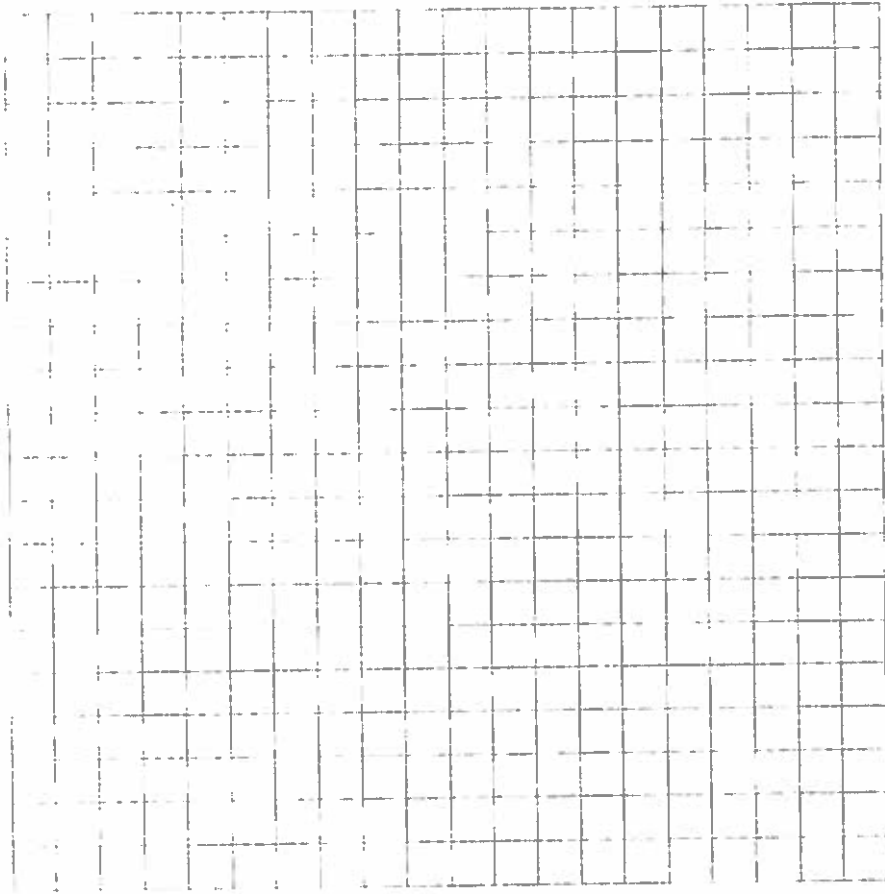
6.) The diagram below shows a cumulative frequency histogram of the students' test scores in Ms. Wedow's algebra class.

Ms. Wedow's Algebra Class Test Scores
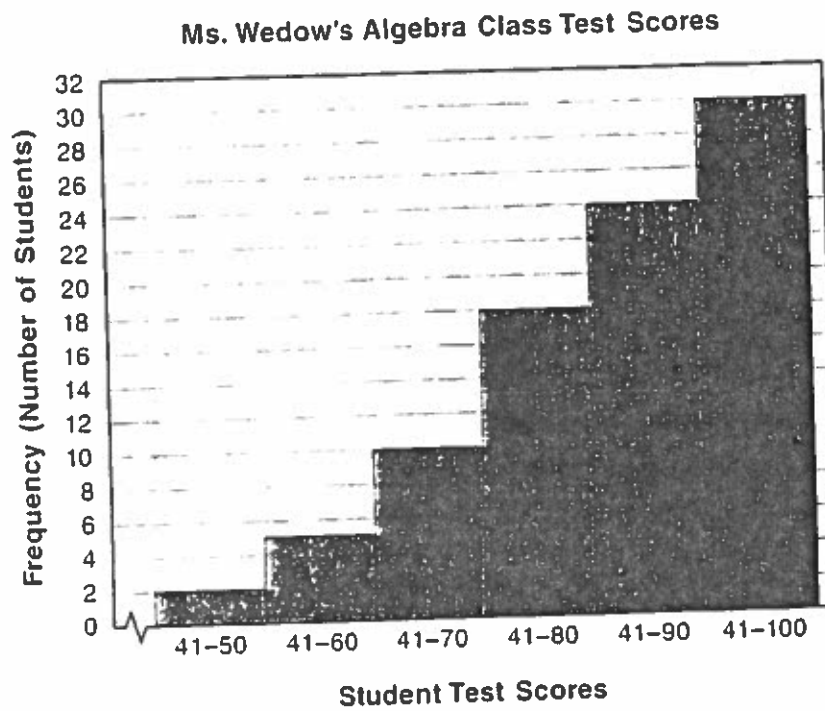
Determine the total number of students in the class.

40

Determine how many students scored higher than 70.

20

State which *ten-point* interval contains the median.

71-80

State which *two ten-point* intervals contain the same frequency.

81-90
91-100

Area

1) The square dart board shown below has a side that measures 40 inches. The shaded portion in the center is a square whose side is 15 inches. A dart thrown at the board is equally likely to land on any point on the dartboard.

40 inches

15 inches
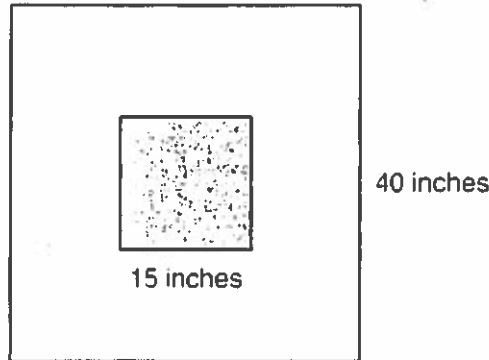
Find the probability that a dart hitting the board will *not* land in the shaded area.

$$\frac{1375}{1600}$$

2) A designer created the logo shown below. The logo consists of a square and four quarter-circles of equal size.

3 in   3 in
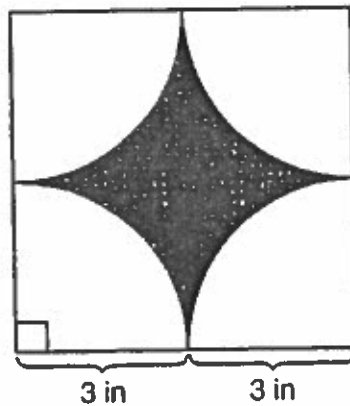
Express, in terms of π, the exact area, in square inches, of the shaded region.

$36 - 9\pi$

3) In the diagram below, circle O is inscribed in square $ABCD$. The square has an area of 36.
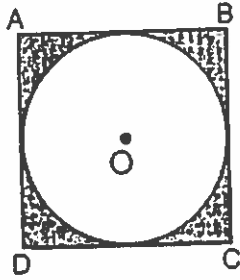
What is the area of the circle?

(1) 9π (3) 3π

(2) 6π (4) 36π

4) In the diagram below, $MATH$ is a rectangle, $GB = 4.6$, $MH = 6$, and $HT = 15$.
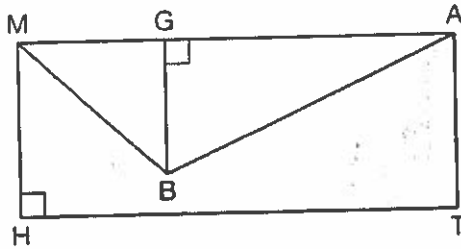
What is the area of polygon $MBATH$?

(1) 34.5   (3) 90.0

(2) 55.5   (4) 124.5

5) The figure shown below is composed of two rectangles and a quarter circle.
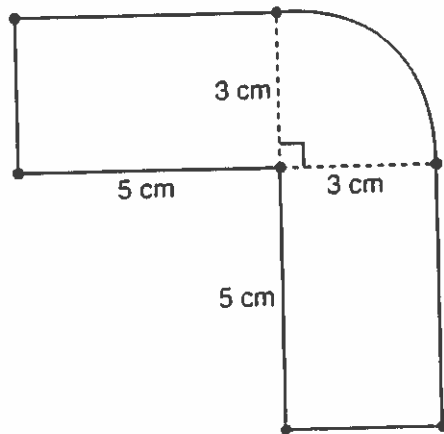
What is the area of this figure, to the *nearest square centimeter*?

(1) 33   (3) 44

(2) 37   (4) 58

6) Luis is going to paint a basketball court on his driveway, as shown in the diagram below. This basketball court consists of a rectangle and a semicircle.

8 ft
10 ft
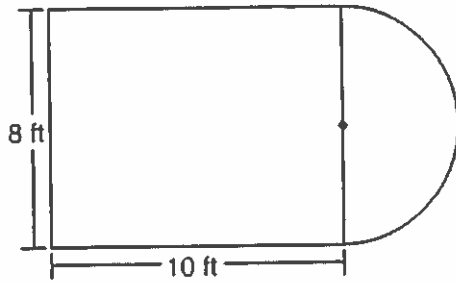
Which expression represents the area of this basketball court, in square feet?

(1) 80   (3) 80 + 16π

(2) 80 + 8π   (4) 80 + 64π   2

7) A figure is made up of a rectangle and a semicircle as shown in the diagram below.

6 cm
5 cm
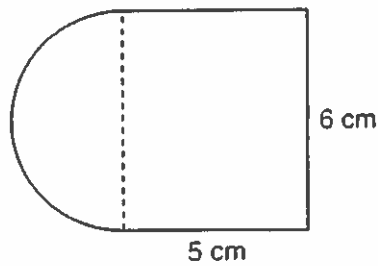
What is the area of the figure, to the *nearest tenth of a square centimeter*?

(1) 39.4   (3) 48.8

(2) 44.1   (4) 58.3   2

8) In the diagram below, the circumference of circle O is 16π inches. The length of $\overline{BC}$ is three-quarters of the length of diameter $\overline{AD}$ and $CE = 4$ inches. Calculate the area, in square inches, of trapezoid $ABCD$.
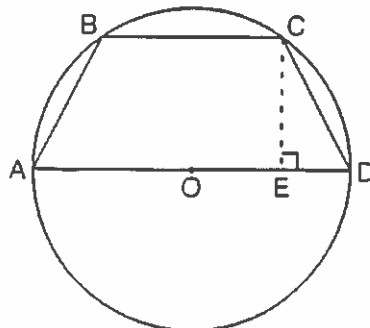
56

NAME: _____

Volume vs Surface Area

1.) The diagram below represents Joe's two fish tanks.

16 in
12 in
30 in
6 in
9 in
12 in
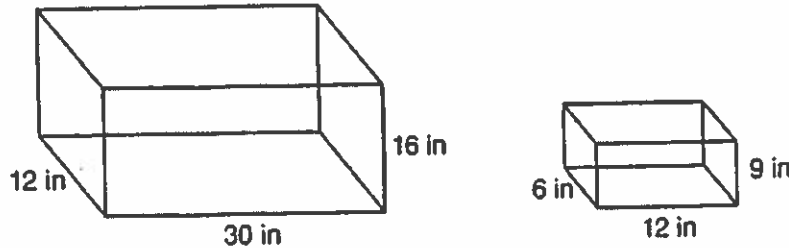
Joe's larger tank is completely filled with water. He takes water from it to completely fill the small tank. Determine how many cubic inches of water will remain in the larger tank.

5,112

2) A soup can is in the shape of a cylinder. The can has a volume of 342 cm³ and a diameter of 6 cm. Express the height of the can in terms of π.

$$\frac{38}{\pi}$$

Determine the maximum number of soup cans that can be stacked on their base between two shelves if the distance between the shelves is exactly 36 cm. Explain your answer.

2

3) A cylinder has a diameter of 10 inches and a height of 2.3 inches. What is the volume of this cylinder, to the *nearest tenth of a cubic inch*?

3

(1) 72.3   (3) 180.6

(2) 83.1   (4) 722.6

4| Lenny made a cube in technology class. Each edge measured 1.5 cm. What is the volume of the cube in cubic centimeters?

(1) 2.25   (3) 9.0

(2) 3.375   (4) 13.5

2

5) Find the volume, in cubic centimeters, *and* the surface area, in square centimeters, of the rectangular prism shown below.

4 cm

2 cm

10 cm
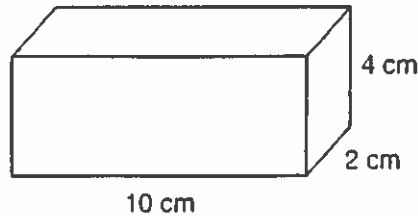
$Vol = 80$

$S.A. = 136$

6| How many square inches of wrapping paper are needed to entirely cover a box that is 2 inches by 3 inches by 4 inches?

(1) 18   (3) 26

(2) 24   (4) 52

4

7) Mrs. Ayer is painting the outside of her son's toy box, including the top and bottom. The toy box measures 3 feet long, 1.5 feet wide, and 2 feet high. What is the total surface area she will paint?

(1) 9.0 ft^2 (3) 22.5 ft^2

(2) 13.5 ft^2 (4) 27.0 ft^2

4

8) The length and width of the base of a rectangular prism are 5.5 cm and 3 cm. The height of the prism is 6.75 cm. Find the *exact* value of the surface area of the prism, in square centimeters.

147.75

Perimeter

1) A window is made up of a single piece of glass in the shape of a semicircle and a rectangle, as shown in the diagram below. Tess is decorating for a party and wants to put a string of lights all the way around the outside edge of the window.

Window

12 ft

10 ft
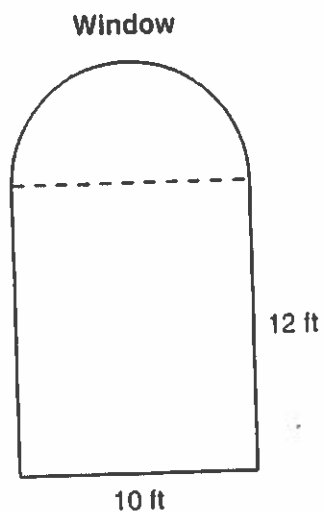
To the *nearest foot*, what is the length of the string of lights that Tess will need to decorate the window?

50

2) A playground in a local community consists of a rectangle and two semicircles, as shown in the diagram below.

15 yards

25 yards
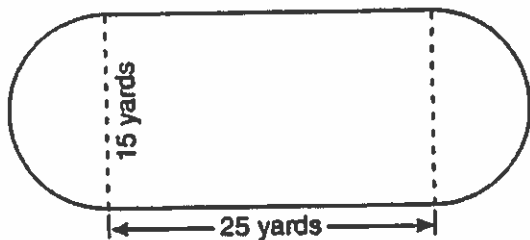
Which expression represents the amount of fencing, in yards, that would be needed to completely enclose the playground?

(1) $15\pi + 50$ (3) $30\pi + 50$

(2) $15\pi + 80$ (4) $30\pi + 80$

3) A garden is in the shape of an isosceles trapezoid and a semicircle, as shown in the diagram below. A fence will be put around the perimeter of the entire garden.

8 m

7 m

12 m
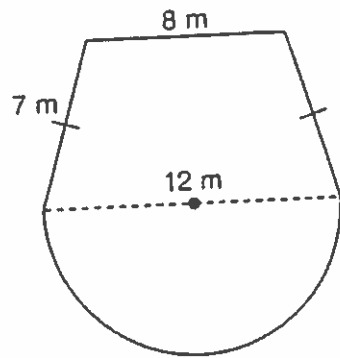
Which expression represents the length of fencing, in meters, that will be needed?

(1) $22 + 6\pi$

(2) $22 + 12\pi$

(3) $15 + 6\pi$

(4) $15 + 12\pi$

4) What is the perimeter of a regular pentagon with a side whose length is $x + 4$?

(1) $x^2 + 16$

(2) $4x + 16$

(3) $5x + 4$

(4) $5x + 20$

NAME: _____

Relative Error

1) Ryan estimates the measurement of the volume of a popcorn container to be 282 cubic inches. The actual volume of the popcorn container is 289 cubic inches. What is the relative error of Ryan's measurement to the *nearest thousandth*?

(1) 0.024   (3) 0.096

(2) 0.025   (4) 1.025

1

2) The dimensions of a rectangle are measured to be 12.2 inches by 11.8 inches. The actual dimensions are 12.3 inches by 11.9 inches. What is the relative error, to the *nearest ten-thousandth*, in calculating the area of the rectangle?

(1) 0.0168   (3) 0.0165

(2) 0.0167   (4) 0.0164

3

3) Carrie bought new carpet for her living room. She calculated the area of the living room to be 174.2 square feet. The actual area was 149.6 square feet. What is the relative error of the area to the *nearest ten-thousandth*?

(1) 0.1412   (3) 1.8588

(2) 0.1644   (4) 2.1644

2

4) Corinne calculated the area of a paper plate to be 50.27 square inches. If the actual area of the plate is 55.42 square inches, what is the relative error in calculating the area, to the *nearest thousandth*?

(1) 0.092   (3) 0.102

(2) 0.093   (4) 0.103

5) Jack wants to replace the flooring in his rectangular kitchen. He calculates the area of the floor to be 12.8 square meters. The actual area of the floor is 13.5 square meters. What is the relative error in calculating the area of the floor, to the *nearest thousandth*?

(1) 0.051   (3) 0.054

(2) 0.052   (4) 0.055

2

6) The actual dimensions of a rectangle are 2.6 cm by 6.9 cm. Andy measures the sides as 2.5 cm by 6.8 cm. In calculating the area, what is the relative error, to the *nearest thousandth*?

(1) 0.055   (3) 0.022

(2) 0.052   (4) 0.021

2|

7) To calculate the volume of a small wooden cube, Ezra measured an edge of the cube as 2 cm. The actual length of the edge of Ezra's cube is 2.1 cm. What is the relative error in his volume calculation to the nearest hundredth?

(1) 0.13   (3) 0.15

(2) 0.14   (4) 0.16   2

8.) Alexis calculates the surface area of a gift box as 600 square inches. The actual surface area of the gift box is 592 square inches. Find the relative error of Alexis' calculation expressed as a decimal to the *nearest thousandth*.

.014

9) Using his ruler, Howell measured the sides of a rectangular prism to be 5 cm by 8 cm by 4 cm. The actual measurements are 5.3 cm by 8.2 cm by 4.1 cm. Find Howell's relative error in calculating the volume of the prism, to the *nearest thousandth*.

.102

10.) At the end of week one, a stock had increased in value from $5.75 a share to $7.50 a share. Find the percent of increase at the end of week one to the *nearest tenth of a percent*.

At the end of week two, the same stock had decreased in value from $7.50 to $5.75. Is the percent of decrease at the end of week two the same as the percent of increase at the end of week one? Justify your answer.

30.4

11) Sarah measures her rectangular bedroom window for a new shade. Her measurements ... 36 inches by 42 inches. The actual measurements of the window are 36.5 inches and 42.5 inches.

Using the measurements that Sarah took, determine the number of square inches in the area of the window.

1,512

Determine the number of square inches in the actual area of the window.

1,551.25

Determine the relative error in calculating the area. Express your answer as a decimal to the *nearest thousandth*.

.025

2) Sophie measured a piece of paper to be 21.7 cm by 28.5 cm. The piece of paper is actually 21.6 cm by 28.4 cm.

Determine the number of square centimeters in the area of the piece of paper using Sophie's measurements.

$$618.45$$

Determine the number of square centimeters in the actual area of the piece of paper.

Determine the relative error in calculating the area. Express your answer as a decimal to the *nearest thousandth*.

Sophie does not think there is a significant amount of error. Do you agree or disagree? Justify your answer.

NAME: _____

Properties

1) The statement 2 + 0 = 2 is an example of the use of which property of real numbers?

   (1) associative   (3) additive inverse

   (2) additive identity   (4) distributive

                                      2

2) Perform the indicated operation: $-6(a - 7)$

   State the name of the property used.

                          $-6a + 42$

3) What is the additive inverse of the expression $a - b$?

   (1) $a + b$ (3) $-a + b$

   (2) $a - b$ (4) $-a - b$ 3

4) Which equation illustrates the associative property?

   (1) $x + y + z = x + y + z$

   (2) $x(y + z) = xy + xz$

   (3) $x + y + z = z + y + x$

   (4) $(x + y) + z = x + (y + z)$ 4

5) Which equation is an example of the use of the associative property of addition?

   (1) $x + 7 = 7 + x$

   (2) $3(x + y) = 3x + 3y$

   (3) $(x + y) + 3 = x + (y + 3)$ 3

   (4) $3 + (x + y) = (x + y) + 3$

6) Chad complained to his friend that he had five equations to solve for homework. Are all of the homework problems equations? Justify your answer.

Math Homework

1. $3x^2 \cdot 2x^4$

2. $5 - 2x = 3x$

3. $3(2x + 7)$

4. $7x^2 + 2x - 3x^2 - 9$

5. $\frac{2}{3} = \frac{x+2}{6}$

Name __Chad__

NO

7) A method for solving $5(x - 2) - 2(x - 5) = 9$ is shown below. Identify the property used to obtain *each* of the two indicated steps.

$5(x - 2) - 2(x - 5) = 9$

(1) $5x - 10 - 2x + 10 = 9$ (1) _____ Dist

(2) $5x - 2x - 10 + 10 = 9$ (2) _____ Comm

$3x + 0 = 9$

$3x = 9$

$x = 3$

8) Debbie solved the linear equation $3(x + 4) - 2 = 16$ as follows:

[Line 1] $3(x + 4) - 2 = 16$

[Line 2] $3(x + 4) = 18$

[Line 3] $3x + 4 = 18$

[Line 4] $3x = 14$

[Line 5] $x = 4\frac{2}{3}$

She made an error between lines

(1) 1 and 2   (3) 3 and 4

(2) 2 and 3   (4) 4 and 5

2

NAME: _____

Evaluating Expressions, Solving Equations and Inequalities

1) What is the value of the expression $-3x^2y + 4x$ when $x = -4$ and $y = 2$?

(1) -112 (3) 80

(2) -80 (4) 272

2) The value of the expression $-|a - b|$ when $a = 7$ and $b = -3$ is

(1) -10 (3) -4

(2) 10   (4) 4

3) What is the value of the expression $|-5x + 12|$ when $x = 5$?

(1) -37 (3) 13

(2) -13 (4) 37

_____ 3

4) Given: $A = \{18, 6, -3, -12\}$

Determine all elements of set A that are in the solution of the inequality $\frac{2}{3}x + 3 < -2x - 7$.

-12

5) Which value of p is the solution of $5p - 1 = 2p + 20$?

(1) $\frac{19}{7}$ (3) 3

(2) $\frac{19}{3}$ (4) 7

4

6) What is the value of x in the equation $2(x - 4) = 4(2x + 1)$?

(1) -2 (3) $-\frac{1}{2}$

(2) 2   (4) $\frac{1}{2}$

7) Solve for x: $\frac{3}{5}(x + 2) = x - 4$

(1) 8   (3) 15

(2) 13   (4) 23

2

8) Solve algebraically for x: $2(x - 4) \geq \frac{1}{2}(5 - 3x)$

$$X \geq 3$$

9) Which value of x is in the solution set of the inequality $-2(x - 5) < 4$?

(1) 0   (3) 3

(2) 2   (4) 5

4

10.) Which value of x is in the solution set of the inequality $-4x + 2 > 10$?

(1) -2   (3) 3

(2) 2   (4) -4

4

11) What is the solution of $3(2m - 1) \leq 4m + 7$?

(1) $m \leq 5$ (3) $m \leq 4$

(2) $m \geq 5$ (4) $m \geq 4$

1

12) What is the solution of the inequality $-6x - 17 \geq 8x + 25$?

(1) $x \geq 3$ (3) $x \geq -3$

(2) $x \leq 3$ (4) $x \leq -3$

4

13) Which value of x is in the solution set of $\frac{4}{3}x + 5 < 17$?

(1) 8   (3) 12

(2) 9   (4) 16

1

NAME: _____

Solving for a Variable

1) If $3ax + b = c$, then x equals

(1) $c - b + 3a$

(3) $\dfrac{c - b}{3a}$

(2) $c + b - 3a$

(4) $\dfrac{b - c}{3a}$

3

2) If the formula for the perimeter of a rectangle is $P = 2l + 2w$, then w can be expressed as

(1) $w = \dfrac{2l - P}{2}$

(3) $w = \dfrac{P - l}{2}$

(2) $w = \dfrac{P - 2l}{2}$

(4) $w = \dfrac{P - 2w}{2l}$

2

3) Solve for c in terms of a and b: $bc + ac = ab$

$$C = \frac{ab}{b + a}$$

4.) If $a + ar = b + r$, the value of a in terms of b and r can be expressed as

(1) $\dfrac{b}{r} + 1$

(3) $\dfrac{b + r}{1 + r}$

(2) $\dfrac{1 + b}{r}$

(4) $\dfrac{1 + b}{r + b}$

3

5) A formula used for calculating velocity is $v = \frac{1}{2}at^2$. What is a expressed in terms of v and t?

(1) $a = \dfrac{2v}{t}$

(3) $a = \dfrac{v}{t}$

(2) $a = \dfrac{2v}{t^2}$

(4) $a = \dfrac{v}{2t^2}$

2

6) On a certain day in Toronto, Canada, the temperature was 15° Celsius (C). Using the formula $F = \frac{9}{5}C + 32$, Peter converts this temperature to degrees Fahrenheit (F). Which temperature represents 15°C in degrees Fahrenheit?

(1) −9

(3) 59

(2) 35

(4) 85

3

7) If $\frac{cy}{n} + k = t$, what is y in terms of c, n, k, and t?

(1) $y = \frac{tn + k}{c}$

(3) $y = \frac{n(t + k)}{c}$

(2) $y = \frac{tn - k}{c}$

(4) $y = \frac{n(t - k)}{c}$

4

8) If $s = \frac{2x + t}{r}$, then x equals

(1) $\frac{rs - t}{2}$

(3) $2rs - t$

(2) $\frac{rs + 1}{2}$

(4) $rs - 2t$

1

NAME: _____

Solving Equations (fractional)

1.) What is the value of x in the equation $\frac{2}{x} - 3 = \frac{26}{x}$?

    (1) -8 (3) $\frac{1}{8}$

    (2) $-\frac{1}{8}$ (4) 8

1

2) Which value of x is the solution of $\frac{2x}{5} + \frac{1}{3} = \frac{7x - 2}{15}$?

    (1) $\frac{3}{5}$ (3) 3

    (2) $\frac{31}{26}$ (4) 7

4

3) Solve algebraically for x: $\frac{3}{4} = \frac{-(x + 11)}{4x} + \frac{1}{2x}$

$$-\frac{9}{4}$$

4.) Which value of x is the solution of $\frac{x}{3} + \frac{x + 1}{2} = x$?

    (1) 1 (3) 3

    (2) -1 (4) -3

3

5) Which value of x is the solution of the equation $\frac{2}{3}x + \frac{1}{2} = \frac{5}{6}$?

    (1) $\frac{1}{2}$ (3) $\frac{2}{3}$

    (2) 2 (4) $\frac{3}{2}$

1

6.) Which value of x is the solution of the equation $\frac{2x}{3} + \frac{x}{6} = 5$?

    (1) 6 (3) 15

    (2) 10 (4) 30

1

7) Solve for m: $\frac{m}{5} + \frac{3(m - 1)}{2} = 2(m - 3)$

15

NAME: _____

Solving Algebraic Fractions

1) Which value of x is the solution of $\frac{2x-3}{x-4} = \frac{2}{3}$?

(1) $-\frac{1}{4}$

(3) -4

(2) $\frac{1}{4}$

(4) 4

2.) What is the solution of $\frac{k+4}{2} = \frac{k+9}{3}$?

(1) 1

(3) 6

(2) 5

(4) 14

3.) What is the solution set of $\frac{x+2}{x-2} = \frac{-3}{x}$?

(1) $\{-2, 3\}$

(3) $\{-1, 6\}$

(2) $\{-3, -2\}$

(4) $\{-6, 1\}$

4.) Which value of x is a solution of $\frac{5}{x} = \frac{x+13}{6}$?

(1) -2

(3) -10

(2) -3

(4) -15

5.) Solve algebraically for x: $\frac{x+2}{6} = \frac{3}{x-1}$

4 and -5

2

3

4

4

NAME: _____

Adding + Subtracting Polynomials

1) What is the sum of $-3x^2 - 7x + 9$ and $-5x^2 + 6x - 4$?

  (1) $-8x^2 - x + 5$ (3) $-8x^2 - 13x + 13$

  (2) $-8x^4 - x + 5$ (4) $-8x^4 - 13x^2 + 13$ 1

2) The sum of $4x^3 + 6x^2 + 2x - 3$ and $3x^3 + 3x^2 - 5x - 5$ is

  (1) $7x^3 + 3x^2 - 3x - 8$ (3) $7x^3 + 9x^2 - 3x - 8$

  (2) $7x^3 + 3x^2 + 7x + 2$ (4) $7x^6 + 9x^4 - 3x^2 - 8$ 3

3) When $3g^2 - 4g + 2$ is subtracted from $7g^2 + 5g - 1$, the difference is

  (1) $-4g^2 - 9g + 3$ (3) $4g^2 + 9g - 3$

  (2) $4g^2 + g + 1$ (4) $10g^2 + g + 1$ 3

4) When $5x + 4y$ is subtracted from $5x - 4y$, the difference is

  (1) 0 (3) $8y$

  (2) $10x$ (4) $-8y$ 4

5) What is the result when $2x^2 + 3xy - 6$ is subtracted from $x^2 - 7xy + 2$?

  (1) $-x^2 - 10xy + 8$ (3) $-x^2 - 4xy - 4$

  (2) $x^2 + 10xy - 8$ (4) $x^2 - 4xy - 4$ 1

6) When $4x^2 + 7x - 5$ is subtracted from $9x^2 - 2x + 3$, the result is

  (1) $5x^2 + 5x - 2$ (3) $-5x^2 + 5x - 2$

  (2) $5x^2 - 9x + 8$ (4) $-5x^2 + 9x - 8$ 2

NAME: _____

Adding + Subtracting Algebraic Fractions

1) What is the sum of $\dfrac{2y}{y+5}$ and $\dfrac{10}{y+5}$ expressed in simplest form?

(1) 1

(3) $\dfrac{12y}{y+5}$

(2) 2

(4) $\dfrac{2y+10}{y+5}$

2

2) What is the sum of $\dfrac{-x+7}{2x+4}$ and $\dfrac{2x+5}{2x+4}$?

(1) $\dfrac{x+12}{2x+4}$

(3) $\dfrac{x+12}{4x+8}$

(2) $\dfrac{3x+12}{2x+4}$

(4) $\dfrac{3x+12}{4x+8}$

1

3) What is the sum of $\dfrac{3}{2x}$ and $\dfrac{7}{4x}$?

(1) $\dfrac{21}{8x^2}$

(3) $\dfrac{10}{6x}$

(2) $\dfrac{13}{4x}$

(4) $\dfrac{13}{8x}$

2

4) What is the sum of $\dfrac{3}{2x}$ and $\dfrac{4}{3x}$ expressed in simplest form?

(1) $\dfrac{12}{6x^2}$

(3) $\dfrac{7}{5x}$

(2) $\dfrac{17}{6x}$

(4) $\dfrac{17}{12x}$

2

5) What is the sum of $\dfrac{3x^2}{x-2}$ and $\dfrac{x^2}{x-2}$?

(1) $\dfrac{3x^4}{(x-2)^2}$

(3) $\dfrac{4x^2}{(x-2)^2}$

(2) $\dfrac{3x^4}{x-2}$

(4) $\dfrac{4x^2}{x-2}$

4

6) What is $\frac{6}{5x} - \frac{2}{3x}$ in simplest form?

(1) $\frac{8}{15x^2}$

(3) $\frac{4}{15x}$

(2) $\frac{8}{15x}$

(4) $\frac{4}{2x}$

2

7) What is $\frac{7}{12x} - \frac{y}{6x^2}$ expressed in simplest form?

(1) $\frac{7-y}{6x}$

(3) $-\frac{7y}{12x^2}$

(2) $\frac{7-y}{12x-6x^2}$

(4) $\frac{7x-2y}{12x^2}$

4

8) What is $\frac{2+x}{5x} - \frac{x-2}{5x}$ expressed in simplest form?

(1) 0

(3) $\frac{4}{5x}$

(2) $\frac{2}{5}$

(4) $\frac{2x+4}{5x}$

3

9) What is $\frac{6}{4a} - \frac{2}{3a}$ expressed in simplest form?

(1) $\frac{4}{a}$

(3) $\frac{8}{7a}$

(2) $\frac{5}{6a}$

(4) $\frac{10}{12a}$

2

NAME: _____

Reducing Algebraic Fractions

1) Simplify: $\dfrac{27k^5m^8}{(4k^3)(9m^2)}$

$$\dfrac{3k^2m^6}{4}$$

2) The expression $\dfrac{(4x^3)^2}{2x}$ is equivalent to

(1) $4x^4$

(3) $8x^4$

(2) $4x^5$

(4) $8x^5$

4

3) The expression $\dfrac{12w^9y^3}{-3w^3y^3}$ is equivalent to

(1) $-4w^6$

(3) $9w^6$

(2) $-4w^3y$

(4) $9w^3y$

1

4) Which expression represents $\dfrac{27x^{18}y^3}{9x^6y}$ in simplest form?

(1) $3x^{12}y^1$

(3) $18x^{12}y^4$

(2) $3x^3y^3$

(4) $18x^3y^5$

1

5.) The expression $\dfrac{(10w^3)^2}{5w}$ is equivalent to

(1) $2w^3$

(3) $20w^5$

(2) $2w^5$

(4) $20w^8$

3

6) Which expression represents $\dfrac{-14a^2c^5}{7a^3c^2}$ in simplest form?

(1) $-2ac^1$

(3) $\dfrac{-2c^1}{a}$

(2) $-2ac^6$

(4) $\dfrac{-2c^9}{a}$

4

7) Express in simplest form: $\dfrac{45a^4b^3 - 90a^3b}{15a^2b}$

$$3a^2b^2 - 6a$$

8) Which expression represents $\dfrac{12x^3 - 6x^2 + 2x}{2x}$ in simplest form?

(1) $6x^2 - 3x$ (3) $6x^2 - 3x + 1$

(2) $10x^2 - 4x$ (4) $10x^2 - 4x + 1$

$$3$$

9) Which expression represents $\dfrac{2x^2 - 12x}{x - 6}$ in simplest form?

(1) 0 (3) $4x$

(2) $2x$ (4) $2x + 2$

$$2$$

10) Which expression represents $\dfrac{25x - 125}{x^2 - 25}$ in simplest form?

(1) $\dfrac{5}{x}$ (3) $\dfrac{25}{x - 5}$

(2) $\dfrac{-5}{x}$ (4) $\dfrac{25}{x + 5}$

$$4$$

11) Which expression represents $\dfrac{x^2 - x - 6}{x^2 - 5x + 6}$ in simplest form?

(1) $\dfrac{x + 2}{x - 2}$ (3) $\dfrac{1}{5}$

(2) $\dfrac{-x - 6}{-5x + 6}$ (4) -1

$$1$$

12) Express in simplest form: $\dfrac{x^2 - 1}{x^2 + 3x + 2}$

$$\frac{x - 1}{x + 2}$$

13) Which expression represents $\dfrac{x^2 - 2x - 15}{x^2 + 3x}$ in simplest form?

(1) -5 (3) $\dfrac{-2x - 5}{x}$

(2) $\dfrac{x - 5}{x}$ (4) $\dfrac{-2x - 15}{3x}$

$$2$$

NAME: _____

Mult + Div Algebraic Fractions

1) What is the product of $\frac{4x}{x-1}$ and $\frac{x^2-1}{3x+3}$ expressed in simplest form?

(1) $\frac{4x}{3}$

(3) $\frac{4x^2}{3(x+1)}$

(2) $\frac{4x^2}{3}$

(4) $\frac{4(x+1)}{3}$

$|$

2) What is the product of $\frac{x^2-1}{x+1}$ and $\frac{x+3}{3x-3}$ expressed in simplest form?

(1) x

(3) $x+3$

(2) $\frac{x}{3}$

(4) $\frac{x+3}{3}$

4

3) What is the quotient of $\frac{x}{x+4}$ divided by $\frac{2x}{x^2-16}$?

(1) $\frac{2}{x-4}$

(3) $\frac{2x^2}{x^2-16}$

(2) $\frac{2x^2}{x-4}$

(4) $\frac{x-4}{2}$

4

4) Perform the indicated operation and simplify: $\frac{3x+6}{4x+12} \div \frac{x^2-4}{x+3}$

$$\frac{3}{4(x-2)}$$

5) Express in simplest form: $\frac{x^2+9x+14}{x^2-49} \div \frac{3x+6}{x^2+x-56}$

$$\frac{x+8}{3}$$

6) Express in simplest form: $\frac{2x^2-8x-42}{6x^2} \div \frac{x^2-9}{x^2-3x}$

$$\frac{x-7}{3x}$$

NAME: _____

Writing Expressions

1.) Which algebraic expression represents 15 less than x divided by 9?

   (1) $\frac{x}{9} - 15$

   (2) $9x - 15$

   (3) $15 - \frac{x}{9}$

   (4) $15 - 9x$

   1

2) Marie currently has a collection of 58 stamps. If she buys s stamps each week for w weeks, which expression represents the total number of stamps she will have?

   (1) $58sw$

   (2) $58 + sw$

   (3) $58s + w$

   (4) $58 + s + w$

   2

3.) Which verbal expression can be represented by $2(x - 5)$?

   (1) 5 less than 2 times x

   (2) 2 multiplied by x less than 5

   (3) twice the difference of x and 5

   (4) the product of 2 and x, decreased by 5

   3

4.) Tim ate four more cookies than Alice. Bob ate twice as many cookies as Tim. If x represents the number of cookies Alice ate, which expression represents the number of cookies Bob ate?

   (1) $2 + (x + 4)$

   (2) $2x + 4$

   (3) $2(x + 4)$

   (4) $4(x + 2)$

   3

5) Mr. Turner bought x boxes of pencils. Each box holds 25 pencils. He left 3 boxes of pencils at home and took the rest to school. Which expression represents the total number of pencils he took to school?

   (1) $22x$

   (2) $25x - 3$

   (3) $25 - 3x$

   (4) $25x - 75$

   4

6) Which verbal expression is represented by $\frac{1}{2}(n-3)$?

(1) one-half n decreased by 3

(2) one-half n subtracted from 3

(3) the difference of one-half n and 3

(4) one-half the difference of n and 3

4

7) If h represents a number, which equation is a correct translation of "Sixty more than 9 times a number is 375"?

(1) $9h = 375$

(2) $9h + 60 = 375$

(3) $9h - 60 = 375$

(4) $60h + 9 = 375$

2

8) Roger is having a picnic for 78 guests. He plans to serve each guest at least one hot dog. If each package, p, contains eight hot dogs, which inequality could be used to determine how many packages of hot dogs Roger will need to buy?

(1) $p \geq 78$

(2) $8p \geq 78$

(3) $8 + p \geq 78$

(4) $78 - p \geq 8$

2

9) The sign shown below is posted in front of a roller coaster ride at the Wadsworth County Fairgrounds.

All riders **MUST** be
at least 48 inches tall.
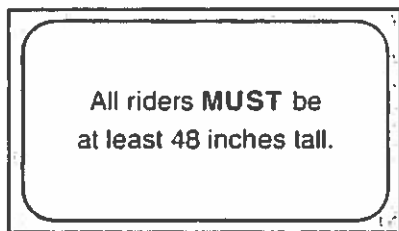
If h represents the height of a rider in inches, what is a correct translation of the statement on this sign?

(1) $h < 48$

(2) $h > 48$

(3) $h \leq 48$

(4) $h \geq 48$

4

10.) Mrs. Smith wrote "Eight less than three times a number is greater than fifteen" on the board. If x represents the number, which inequality is a correct translation of this statement?

(1) $3x - 8 > 15$

(2) $3x - 8 < 15$

(3) $8 - 3x > 15$

(4) $8 - 3x < 15$

1

11) The sum of two numbers is 47, and their difference is 15. What is the larger number?

(1) 16   (3) 32

(2) 31   (4) 36

12) Byron is 3 years older than Doug. The product of their ages is 40. How old is Doug?

(1) 10   (3) 5

(2) 8   (4) 4

13) Michael is 25 years younger than his father. The sum of their ages is 53. What is Michael's age?

(1) 14   (3) 28

(2) 25   (4) 39

14) The ages of three brothers are consecutive even integers. Three times the age of the youngest brother exceeds the oldest brother's age by 48 years. What is the age of the *youngest* brother?

(1) 14   (3) 22

(2) 18   (4) 26

15) Sam and Odel have been selling frozen pizzas for a class fundraiser. Sam has sold half as many pizzas as Odel. Together they have sold a total of 126 pizzas. How many pizzas did Sam sell?

(1) 21   (3) 63

(2) 42   (4) 84

16) An online music club has a one-time registration fee of $13.95 and charges $0.49 to buy each song. If Emma has $50.00 to join the club and buy songs, what is the maximum number of songs she can buy?

(1) 73   (3) 130

(2) 74   (4) 131

17.) Tamara has a cell phone plan that charges $0.07 per minute plus a monthly fee of $19.00. She budgets $29.50 per month for total cell phone expenses without taxes. What is the maximum number of minutes Tamara could use her phone each month in order to stay within her budget?

1

(1) 150

(3) 421

(2) 271

(4) 692

18.) Rhonda has $1.35 in nickels and dimes in her pocket. If she has six more dimes than nickels, which equation can be used to determine x, the number of nickels she has?

(1) $0.05(x + 6) + 0.10x = 1.35$

(2) $0.05x + 0.10(x + 6) = 1.35$

(3) $0.05 + 0.10(6x) = 1.35$

2

(4) $0.15(x + 6) = 1.35$

19.) The ninth grade class at a local high school needs to purchase a park permit for $250.00 for their upcoming class picnic. Each ninth grader attending the picnic pays $0.75. Each guest pays $1.25. If 200 ninth graders attend the picnic, which inequality can be used to determine the number of guests, x, needed to cover the cost of the permit?

(1) $0.75x - (1.25)(200) \geq 250.00$

(2) $0.75x + (1.25)(200) \geq 250.00$

4

(3) $(0.75)(200) - 1.25x \geq 250.00$

(4) $(0.75)(200) + 1.25x \geq 250.00$

20.) Chelsea has $45 to spend at the fair. She spends $20 on admission and $15 on snacks. She wants to play a game that costs $0.65 per game. Write an inequality to find the maximum number of times, x, Chelsea can play the game.

Using this inequality, determine the maximum number of times she can play the game.

15

NAME: _____

Undefined Expressions

1) Which value of x makes the expression $\frac{x+4}{x-3}$ undefined?

   (1) −4   (3) 3

   (2) −3   (4) 0

   3

2) Which value of n makes the expression $\frac{5n}{2n-1}$ undefined?

   (1) 1   (3) $-\frac{1}{2}$

   (2) 0   (4) $\frac{1}{2}$

   4

3) The function $y = \frac{x}{x^2-9}$ is undefined when the value of x is

   (1) 0 or 3   (3) 3, only

   (2) 3 or −3   (4) −3, only

   2

4) The algebraic expression $\frac{x-2}{x^2-9}$ is undefined when x is

   (1) 0   (3) 3

   (2) 2   (4) 9

   3

5) For which values of x is the fraction $\frac{x^2+x-6}{x^2+5x-6}$ undefined?

   (1) 1 and −6   (3) 3 and −2

   (2) 2 and −3   (4) 6 and −1

   1

6) Which value of x makes the expression $\frac{x^2-9}{x^2+7x+10}$ undefined?

   (1) −5   (3) 3

   (2) 2   (4) −3

   1

7) For which set of values of x is the algebraic expression $\frac{x^2-16}{x^2-4x-12}$ undefined?

   (1) {−6, 2}   (3) {−4, 4}

   (2) {−1, 3}   (4) {−2, 6}

   4

NAME: _____

Slope between 2 points

1.) What is the slope of the line that passes through the points (2,5) and (7,3)?

(1) $-\frac{5}{2}$

(2) $-\frac{2}{5}$

(3) $\frac{8}{9}$

(4) $\frac{9}{8}$

2

2.) What is the slope of the line that passes through the points (2,−3) and (5,1)?

(1) $-\frac{2}{3}$

(2) $\frac{2}{3}$

(3) $-\frac{4}{3}$

(4) $\frac{4}{3}$

4

3) What is the slope of the line that passes through the points (−5,4) and (15,−4)?

(1) $-\frac{2}{5}$

(2) 0

(3) $-\frac{5}{2}$

(4) undefined

1

4) What is the slope of the line passing through the points (−2,4) and (3,6)?

(1) $-\frac{5}{2}$

(2) $-\frac{2}{5}$

(3) $\frac{2}{5}$

(4) $\frac{5}{2}$

3

5) What is the slope of the line that passes through the points (3,5) and (−2,2)?

(1) $\frac{1}{5}$

(2) $\frac{3}{5}$

(3) $\frac{5}{3}$

(4) 5

2

6) Write an equation that represents the line that passes through the points (5,4) and (−5,0).

$y = \frac{2}{5}x + 2$

NAME: _____

Slopes of Lines Y = MX + B

1) What is the slope of the line whose equation is $3x - 7y = 9$?

   (1) $-\frac{3}{7}$ (3) $-\frac{7}{3}$

   (2) $\frac{3}{7}$ (4) $\frac{7}{3}$

2

2) Which equation represents a line parallel to the x-axis?

   (1) $x = 5$ (3) $x = \frac{1}{3}y$

   (2) $y = 10$ (4) $y = 5x + 17$

2

3) Which equation represents a line that is parallel to the line $y = 3 - 2x$?

   (1) $4x + 2y = 5$ (3) $y = 3 - 4x$

   (2) $2x + 4y = 1$ (4) $y = 4x - 2$

1

4) Which equation represents a line parallel to the y-axis?

   (1) $y = x$ (3) $x = -y$

   (2) $y = 3$ (4) $x = -4$

4

5) Which equation represents a line parallel to the x-axis?

   (1) $y = -5$ (3) $x = 3$

   (2) $y = -5x$ (4) $x = 3y$

1

6) Which equation represents a line parallel to the y-axis?

   (1) $x = y$ (3) $y = 4$

   (2) $x = 4$ (4) $y = x + 4$

2

7) The graphs of the equations $y = 2x - 7$ and $y - kx = 7$ are parallel when k equals

   (1) -2 (3) -7

   (2) 2 (4) 7

2

8) Which equation represents a line parallel to the graph of $2x - 4y = 16$?

(1) $y = \frac{1}{2}x - 5$ (3) $y = -2x + 6$

(2) $y = -\frac{1}{2}x + 4$ (4) $y = 2x + 8$

9) Which equation represents a line that is parallel to the line $y = -4x + 5$?

(1) $y = -4x + 3$ (3) $y = \frac{1}{4}x + 3$

(2) $y = -\frac{1}{4}x + 5$ (4) $y = 4x + 5$

NAME: _____

Equation of a Line from a point and Slope

1) What is an equation of the line that passes through the point (4,–6) and has a slope of –3?

(1) $y = -3x + 6$ (3) $y = -3x + 10$

(2) $y = -3x - 6$ (4) $y = -3x + 14$

2) Which equation represents the line that passes through the point (1,5) and has a slope of –2?

(1) $y = -2x + 7$ (3) $y = 2x - 9$

(2) $y = -2x + 11$ (4) $y = 2x + 3$

3) What is an equation of the line that passes through the point (3,–1) and has a slope of 2?

(1) $y = 2x + 5$ (3) $y = 2x - 4$

(2) $y = 2x - 1$ (4) $y = 2x - 7$

4) A line having a slope of $\frac{3}{4}$ passes through the point (−8,4). Write the equation of this line in slope-intercept form.

$$y = \frac{3}{4}x + 10$$

NAME: _____

Equation of a line that passes through a point.

1) Which linear equation represents a line containing the point (1,3)?

(1) $x + 2y = 5$ (3) $2x + y = 5$

(2) $x - 2y = 5$ (4) $2x - y = 5$

3

2) Which point lies on the line whose equation is $2x - 3y = 9$?

(1) $(-1,-3)$ (3) $(0,3)$

(2) $(-1,3)$ (4) $(0,-3)$

4

3) Which point is on the line $4y - 2x = 0$?

(1) $(-2,-1)$ (3) $(-1,-2)$

(2) $(-2,1)$ (4) $(1,2)$

1

4) Which point lies on the graph represented by the equation $3y + 2x = 8$?

(1) $(-2,7)$ (3) $(2,4)$

(2) $(0,4)$ (4) $(7,-2)$

4

5) Which equation represents the line that passes through the points $(-3,7)$ and $(3,3)$?

(1) $y = \frac{2}{3}x + 1$ (3) $y = -\frac{2}{3}x + 5$

(2) $y = \frac{2}{3}x + 9$ (4) $y = -\frac{2}{3}x + 9$

3

6) What is an equation of the line that passes through the points (1,3) and (8,5)?

(1) $y + 1 = \frac{2}{7}(x + 3)$ (3) $y - 1 = \frac{2}{7}(x + 3)$

(2) $y - 5 = \frac{2}{7}(x - 8)$ (4) $y + 5 = \frac{2}{7}(x - 8)$

2

7) What is an equation of the line that passes through the points (3,-3) and (-3,-3)?

(1) $y = 3$ (3) $y = -3$

(2) $x = -3$ (4) $x = y$

3

Quadratic Equations

Which type of function is represented by the graph shown below?

4
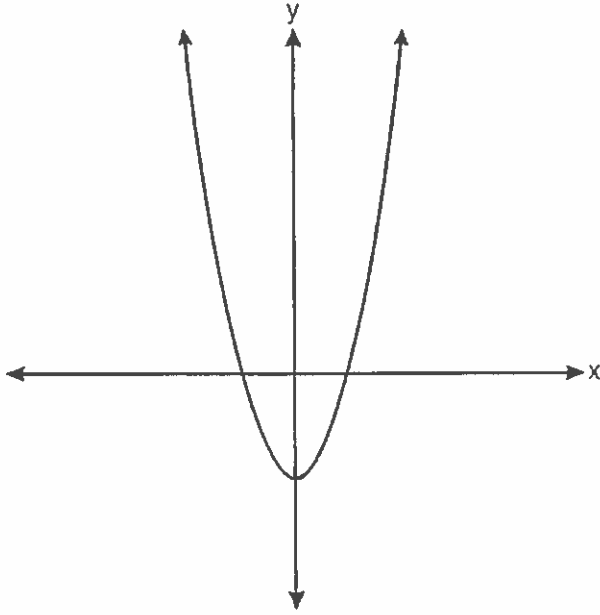
(1) absolute value   (3) linear

(2) exponential   (4) quadratic

Which equation represents a quadratic function?

(1) $y = x + 2$ (3) $y = x^2$

(2) $y = |x + 2|$ (4) $y = 2^x$

3

The equation $y = -x^2 - 2x + 8$ is graphed on the set of axes below.
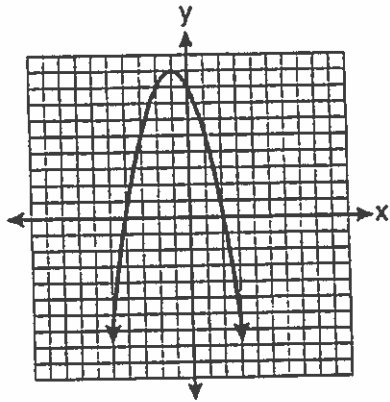
Based on this graph, what are the roots of the equation $-x^2 - 2x + 8 = 0$?

(1) 8 and 0   (3) 9 and –1

(2) 2 and –4   (4) 4 and –2

2

A student correctly graphed the parabola shown below to solve a given quadratic equation.
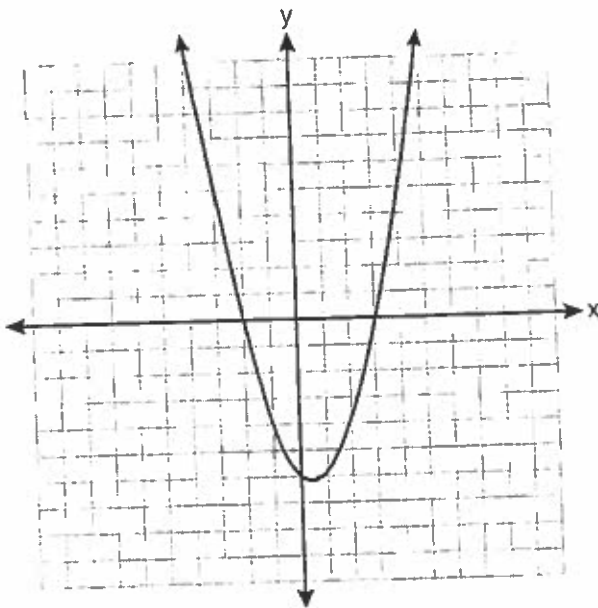
What are the roots of the quadratic equation associated with this graph?

(1) –6 and 3   (3) –3 and 2

(2) –6 and 0   (4) –2 and 3

The equation $y = x^2 + 3x - 18$ is graphed on the set of axes below.
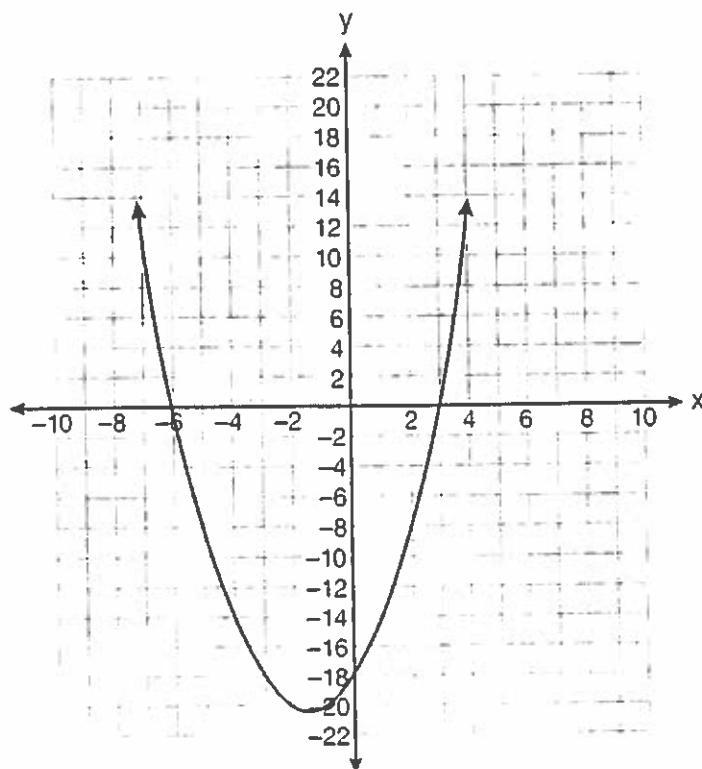
Based on this graph, what are the roots of the equation $x^2 + 3x - 18 = 0$?

(1) −3 and 6   (3) 3 and −6

(2) 0 and −18   (4) 3 and −18

3

What are the roots of the equation $x^2 - 7x + 6 = 0$?

(1) 1 and 7   (3) −1 and −6

(2) −1 and 7   (4) 1 and 6

4

What are the roots of the equation $x^2 - 5x + 6 = 0$?

(1) 1 and −6   (3) −1 and 6

(2) 2 and 3   (4) −2 and −3

2

What are the roots of the equation $x^2 - 10x + 21 = 0$?

(1) 1 and 21

(3) 3 and 7

(2) -5 and -5

(4) -3 and -7

3

The roots of the equation $3x^2 - 27x = 0$ are

(1) 0 and 9

(3) 0 and 3

(2) 0 and -9

(4) 0 and -3

1

The solution to the equation $x^2 - 6x = 0$ is

(1) 0, only

(3) 0 and 6

(2) 6, only

(4) $\pm\sqrt{6}$

3

Which equation has roots of -3 and 5?

(1) $x^2 + 2x - 15 = 0$

(3) $x^2 + 2x + 15 = 0$

(2) $x^2 - 2x - 15 = 0$

(4) $x^2 - 2x + 15 = 0$

2

Find the roots of the equation $x^2 = 30 - 13x$ algebraically

$-15 \text{ and } 2$

Find the roots of the equation $x^2 - x = 6$ algebraically

$-2 \text{ and } 3$

What are the factors of the expression $x^2 + x - 20$?

(1) $(x + 5)$ and $(x + 4)$

(3) $(x - 5)$ and $(x + 4)$

(2) $(x + 5)$ and $(x - 4)$

(4) $(x - 5)$ and $(x - 4)$

2

Factored completely, the expression $2x^2 + 10x - 12$ is equivalent to

(1) $2(x - 6)(x + 1)$

(3) $2(x + 2)(x + 3)$

(2) $2(x + 6)(x - 1)$

(4) $2(x - 2)(x - 3)$

2

A swim team member performs a dive from a 14-foot-high springboard.
The parabola below shows the path of her dive.

Distance from Springboard (feet)
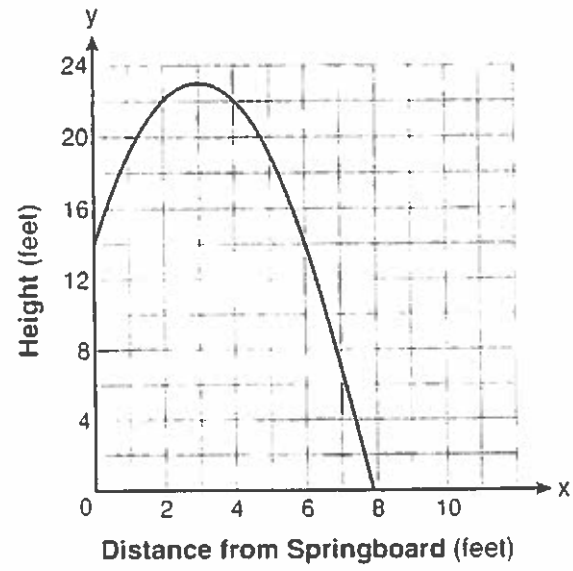
Which equation represents the axis of symmetry?

(1) $x = 3$ (3) $x = 23$

(2) $y = 3$ (4) $y = 23$

What is an equation of the axis of symmetry of the parabola represented
by $y = -x^2 + 6x - 4$?

(1) $x = 3$ (3) $x = 6$

(2) $y = 3$ (4) $y = 6$

What is the equation of the axis of symmetry of the parabola shown in the diagram below?

(1) $x = -0.5$ (3) $x = 4.5$
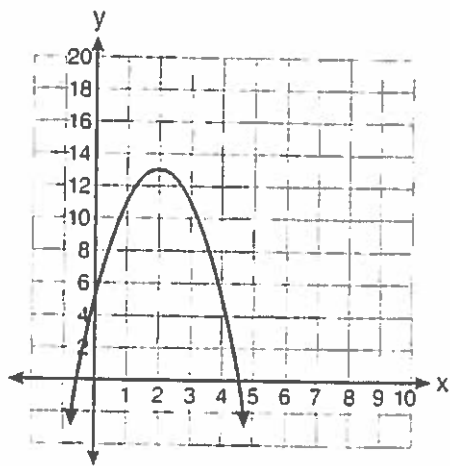
(2) $x = 2$ (4) $x = 13$ 2

State the equation of the axis of symmetry and the coordinates of the vertex of the parabola graphed below.
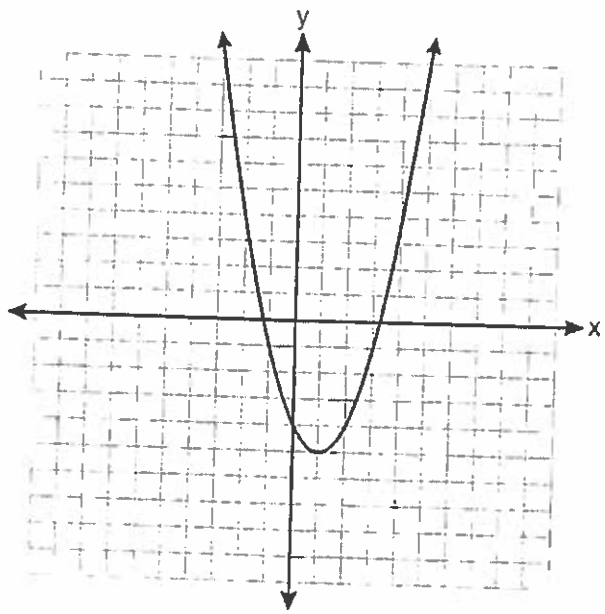
Which equation represents the axis of symmetry of the graph of the parabola below?

2

(1) $y = -3$

(2) $x = -3$
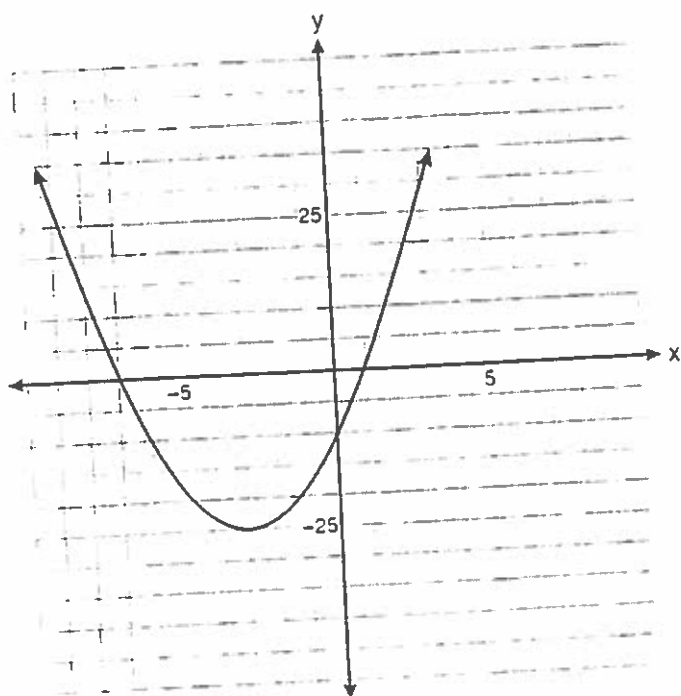
(3) $y = -25$

(4) $x = -25$

The height, y, of a ball tossed into the air can be represented by the equation $y = -x^2 + 10x + 3$, where x is the elapsed time. What is the equation of the axis of symmetry of this parabola?

(1) $y = 5$

(2) $y = -5$

(3) $x = 5$

(4) $x = -5$

The equation of the axis of symmetry of the graph of $y = 2x^2 - 3x + 7$ is

(1) $x = \dfrac{3}{4}$

(2) $y = \dfrac{3}{4}$

(3) $x = \dfrac{3}{2}$

(4) $y = \dfrac{3}{2}$

3

1

Find algebraically the equation of the axis of symmetry and the coordinates of the vertex of the parabola whose equation is $y = -2x^2 - 8x + 3$.

$x = -2 \quad (-2, 11)$

What are the vertex and the axis of symmetry of the parabola shown in the diagram below?
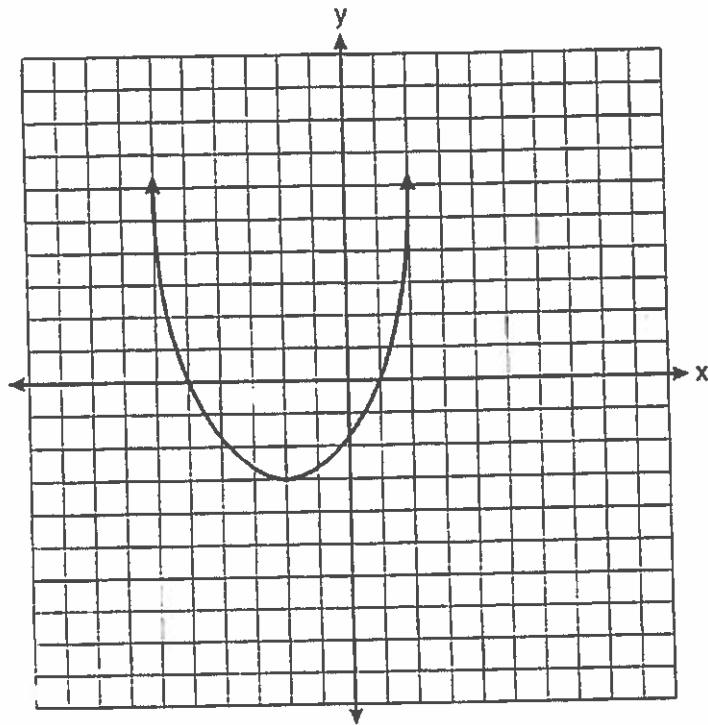
(1) The vertex is $(-2,-3)$, and the axis of symmetry is $x = -2$.

(2) The vertex is $(-2,-3)$, and the axis of symmetry is $y = -2$.

(3) The vertex is $(-3,-2)$, and the axis of symmetry is $y = -2$.

(4) The vertex is $(-3,-2)$, and the axis of symmetry is $x = -2$.

What are the vertex and axis of symmetry of the parabola shown in the diagram below?
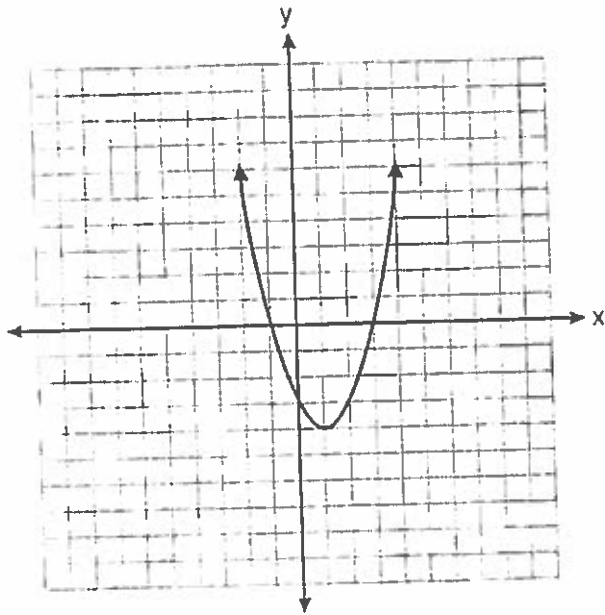
(1) vertex: $(1, -4)$; axis of symmetry: $x = 1$

(2) vertex: $(1, -4)$; axis of symmetry: $x = -4$

(3) vertex: $(-4, 1)$; axis of symmetry: $x = 1$

(4) vertex: $(-4, 1)$; axis of symmetry: $x = -4$

What are the vertex and the axis of symmetry of the parabola shown in the graph below?
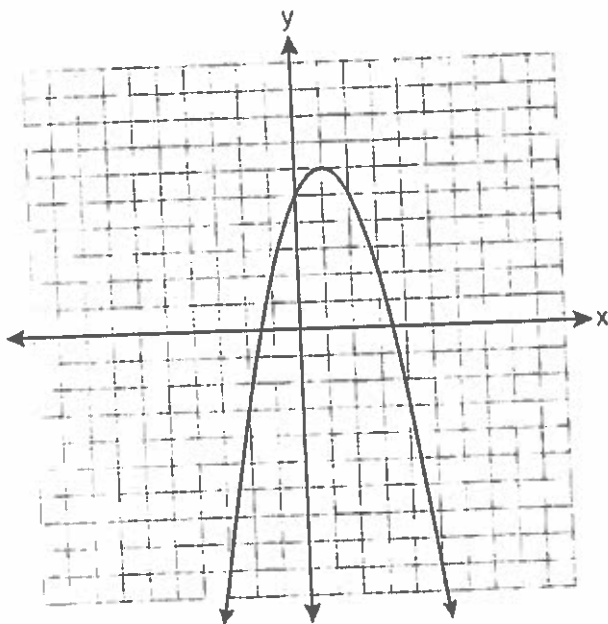
(1) vertex: $(1, 6)$; axis of symmetry: $y = 1$

(2) vertex: $(1, 6)$; axis of symmetry: $x = 1$

(3) vertex: $(6, 1)$; axis of symmetry: $y = 1$

(4) vertex: $(6, 1)$; axis of symmetry: $x = 1$

What are the vertex and axis of symmetry of the parabola $y = x^2 - 16x + 63$?

(1) vertex: $(8,-1)$; axis of symmetry: $x = 8$

(2) vertex: $(8,1)$; axis of symmetry: $x = 8$

(3) vertex: $(-8,-1)$; axis of symmetry: $x = -8$

(4) vertex: $(-8,1)$; axis of symmetry: $x = -8$

1

Melissa graphed the equation $y = x^2$ and Dave graphed the equation $y = -3x^2$ on the same coordinate grid. What is the relationship between the graphs that Melissa and Dave drew?

(1) Dave's graph is wider and opens in the opposite direction from Melissa's graph.

(2) Dave's graph is narrower and opens in the opposite direction from Melissa's graph.

(3) Dave's graph is wider and is three units below Melissa's graph.

(4) Dave's graph is narrower and is three units to the left of Melissa's graph.

2

Consider the graph of the equation $y = ax^2 + bx + c$, when $a \neq 0$. If a is multiplied by 3, what is true of the graph of the resulting parabola?

(1) The vertex is 3 units above the vertex of the original parabola.

(2) The new parabola is 3 units to the right of the original parabola.

(3) The new parabola is wider than the original parabola.

(4) The new parabola is narrower than the original parabola.

4

NAME: _____

Factoring Perfect Squares

1) The expression $x^2 - 36y^2$ is equivalent to

(1) $(x - 6y)(x - 6y)$ (3) $(x + 6y)(x - 6y)$

(2) $(x - 18y)(x - 18y)$ (4) $(x + 18y)(x - 18y)$

3

2) The expression $9x^2 - 100$ is equivalent to

(1) $(9x - 10)(x + 10)$ (3) $(3x - 100)(3x - 1)$

(2) $(3x - 10)(3x + 10)$ (4) $(9x - 100)(x + 1)$

2

3) Which expression is equivalent to $64 - x^2$?

(1) $(8 - x)(8 - x)$ (3) $(x - 8)(x - 8)$

(2) $(8 - x)(8 + x)$ (4) $(x - 8)(x + 8)$

2

4) Which expression is equivalent to $121 - x^2$?

(1) $(x - 11)(x - 11)$ (3) $(11 - x)(11 + x)$

(2) $(x + 11)(x - 11)$ (4) $(11 - x)(11 - x)$

3

5) Which expression is equivalent to $9x^2 - 16$?

(1) $(3x + 4)(3x - 4)$ (3) $(3x + 8)(3x - 8)$

(2) $(3x - 4)(3x - 4)$ (4) $(3x - 8)(3x - 8)$

1

6) If Ann correctly factors an expression that is the difference of two perfect squares, her factors could be

(1) $(2x + y)(x - 2y)$ (3) $(x - 4)(x - 4)$

(2) $(2x + 3y)(2x - 3y)$ (4) $(2y - 5)(y - 5)$

2

7) Which expression represents $36x^2 - 100y^6$ factored completely?

(1) $2(9x + 25y^3)(9x - 25y^3)$
(2) $4(3x + 5y^3)(3x - 5y^3)$
(3) $(6x + 10y^3)(6x - 10y^3)$
(4) $(18x + 50y^3)(18x - 50y^3)$

2

8) Factored, the expression $16x^2 - 25y^2$ is equivalent to

(1) $(4x - 5y)(4x + 5y)$
(2) $(4x - 5y)(4x - 5y)$
(3) $(8x - 5y)(8x + 5y)$
(4) $(8x - 5y)(8x - 5y)$

1

9) Factor completely: $4x^3 - 36x$

$$4x(x-3)(x+3)$$

10) When $a^3 - 4a$ is factored completely, the result is

(1) $(a - 2)(a + 2)$
(2) $a(a - 2)(a + 2)$
(3) $a^2(a - 4)$
(4) $a(a - 2)^2$

2

NAME: _____

Solving Systems Algebraically

1) Which ordered pair is in the solution set of the system of equations
$y = -x + 1$ and $y = x^2 + 5x + 6$?

(1) $(-5,-1)$ (3) $(5,-4)$

(2) $(-5,6)$ (4) $(5,2)$ 2

2) Which ordered pair is a solution of the system of equations
$y = x^2 - x - 20$ and $y = 3x - 15$?

(1) $(-5,-30)$ (3) $(0,5)$

(2) $(-1,-18)$ (4) $(5,-1)$ 2

3) What is the value of the y-coordinate of the solution to the system of
equations $2x + y = 8$ and $x - 3y = -3$?

(1) -2 (3) 3

(2) 2 (4) -3 2

4) Which ordered pair is a solution of the system of equations
$y = x + 3$ and $y = x^2 - x$?

(1) $(6,9)$ (3) $(3,-1)$

(2) $(3,6)$ (4) $(2,5)$ 2

5.) What is the solution of the system of equations $2x - 5y = 11$ and
$-2x + 3y = -9$?

(1) $(-3,-1)$ (3) $(3,-1)$

(2) $(-1,3)$ (4) $(3,1)$ 3

6) Which ordered pair is a solution to the system of equations $y = x$ and
$y = x^2 - 2$?

(1) $(-2,-2)$ (3) $(0,0)$

(2) $(-1,1)$ (4) $(2,2)$ 4

7) What is the value of the y-coordinate of the solution to the system of equations $x + 2y = 9$ and $x - y = 3$?

(1) 6   (3) 3

(2) 2   (4) 5

2

8) What is the solution of the system of equations $c + 3d = 8$ and $c = 4d - 6$?

(1) $c = -14, d = -2$ (3) $c = 2, d = 2$

(2) $c = -2, d = 2$ (4) $c = 14, d = -2$

3

9) What is the value of the y-coordinate of the solution to the system of equations $x - 2y = 1$ and $x + 4y = 7$?

(1) 1   (3) 3

(2) –1   (4) 4

10) Solve the following system of equations algebraically:

$$3x + 2y = 4$$
$$4x + 3y = 7$$

[Only an algebraic solution can receive full credit.]

$(-2, 5)$

11) Julia went to the movies and bought one jumbo popcorn and two chocolate chip cookies for $5.00. Marvin went to the same movie and bought one jumbo popcorn and four chocolate chip cookies for $6.00. How much does one chocolate chip cookie cost?

(1) $0.50   (3) $1.00

(2) $0.75   (4) $2.00

12) The cost of 3 markers and 2 pencils is $1.80. The cost of 4 markers and 6 pencils is $2.90. What is the cost of *each* item? Include appropriate units in your answer.

Marker = .50
pencil = 0.15

13) Jack bought 3 slices of cheese pizza and 4 slices of mushroom pizza for a total cost of $12.50. Grace bought 3 slices of cheese pizza and 2 slices of mushroom pizza for a total cost of $8.50. What is the cost of one slice of mushroom pizza?

(1) $1.50   (3) $3.00

(2) $2.00   (4) $3.50

2

NAME: _____

1.) Two equations were graphed on the set of axes below.
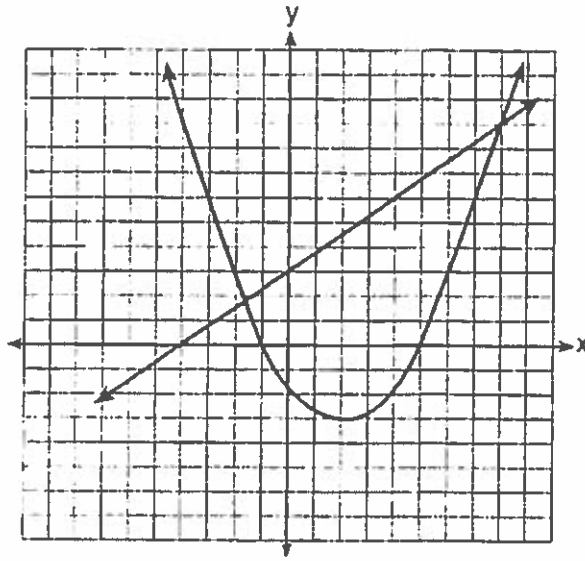
Which point is a solution of the system of equations shown on the graph?

(1) (8,9)   (3) (0,3)

(2) (5,0)   (4) (2,−3)

2) Which ordered pair is a solution of the system of equations shown in the graph below?
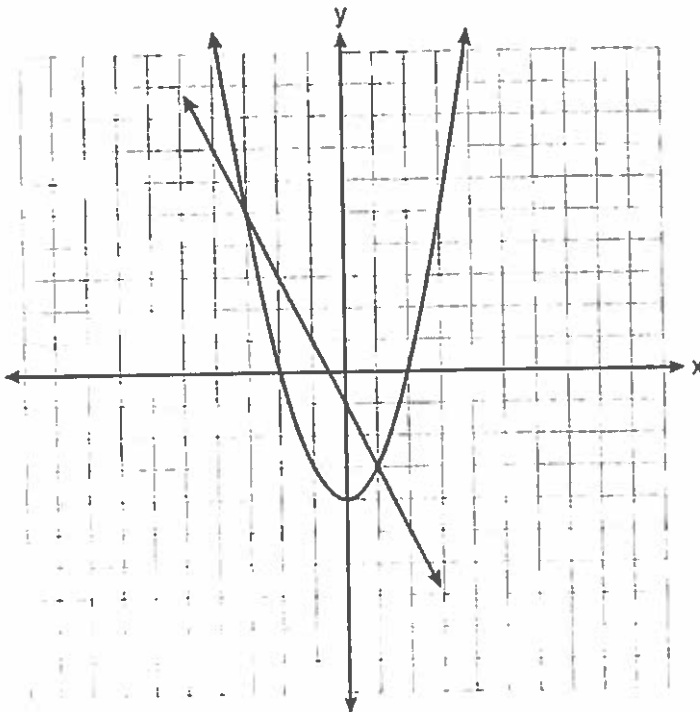
(1) (−3,1)   (3) (0,−1)

(2) (−3,5)   (4) (0,−4)

2

3) Which graph could be used to find the solution of the system of equations $y = 2x + 6$ and $y = x^2 + 4x + 3$?

(1)

(3)

4

(2)
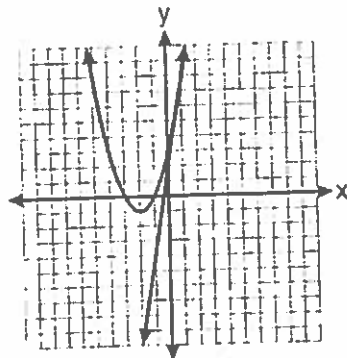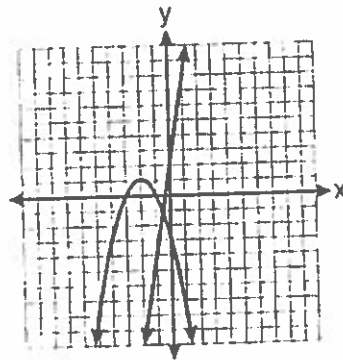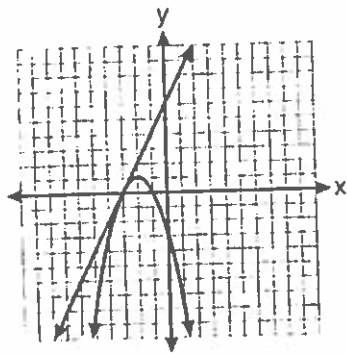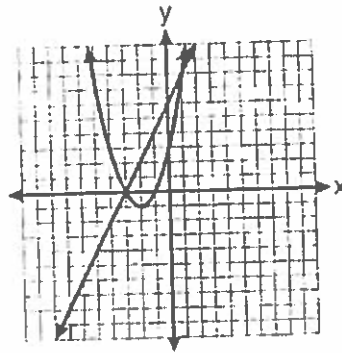
(4)

4.) Which graph can be used to find the solution of the following system of equations?

$$y = x^2 + 2x + 3$$
$$2y - 2x = 10$$

(1)

(2)

(3)
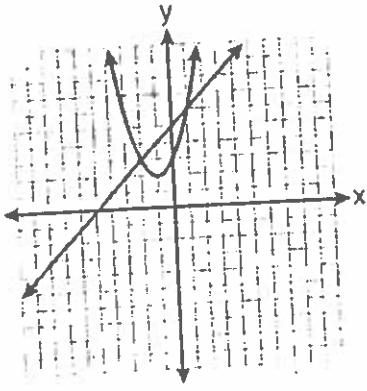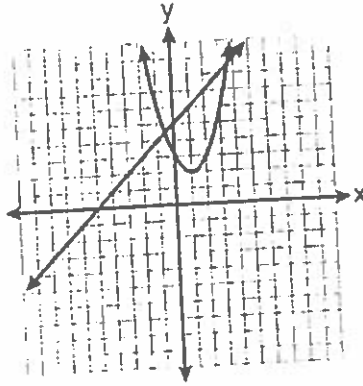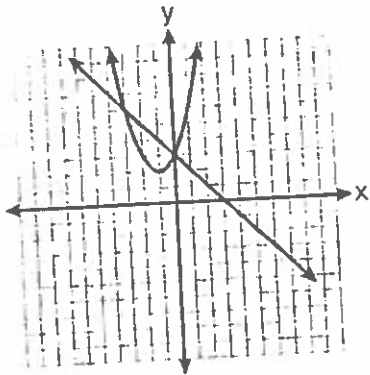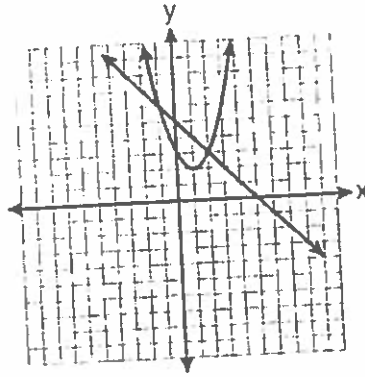
(4)

5.) Graph the equation $y = x^2 - 2x - 3$ on the accompanying set of axes.
Using the graph, determine the roots of the equation $x^2 - 2x - 3 = 0$.

−1 and 3
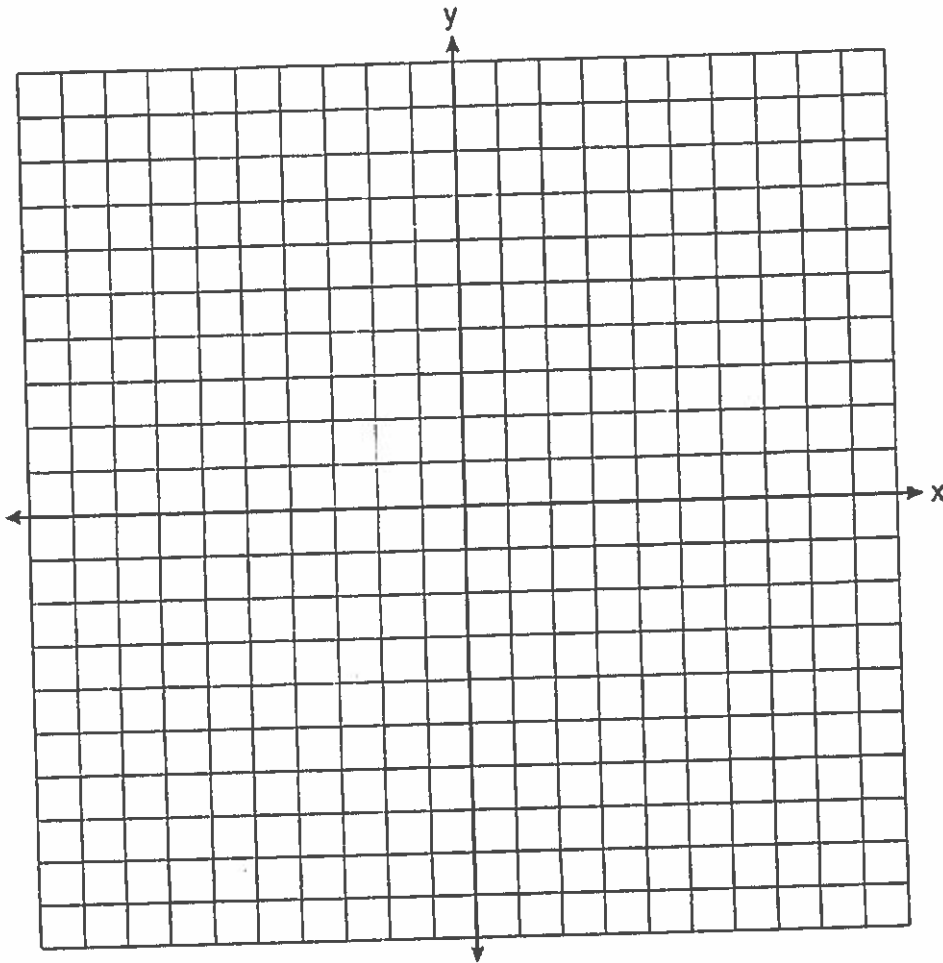
6.) On the set of axes below, solve the following system of equations graphically and state the coordinates of all points in the solution set.

$$y = x^2 + 4x - 5$$
$$y = x - 1$$

$(1, 0)$

$(-4, -5)$
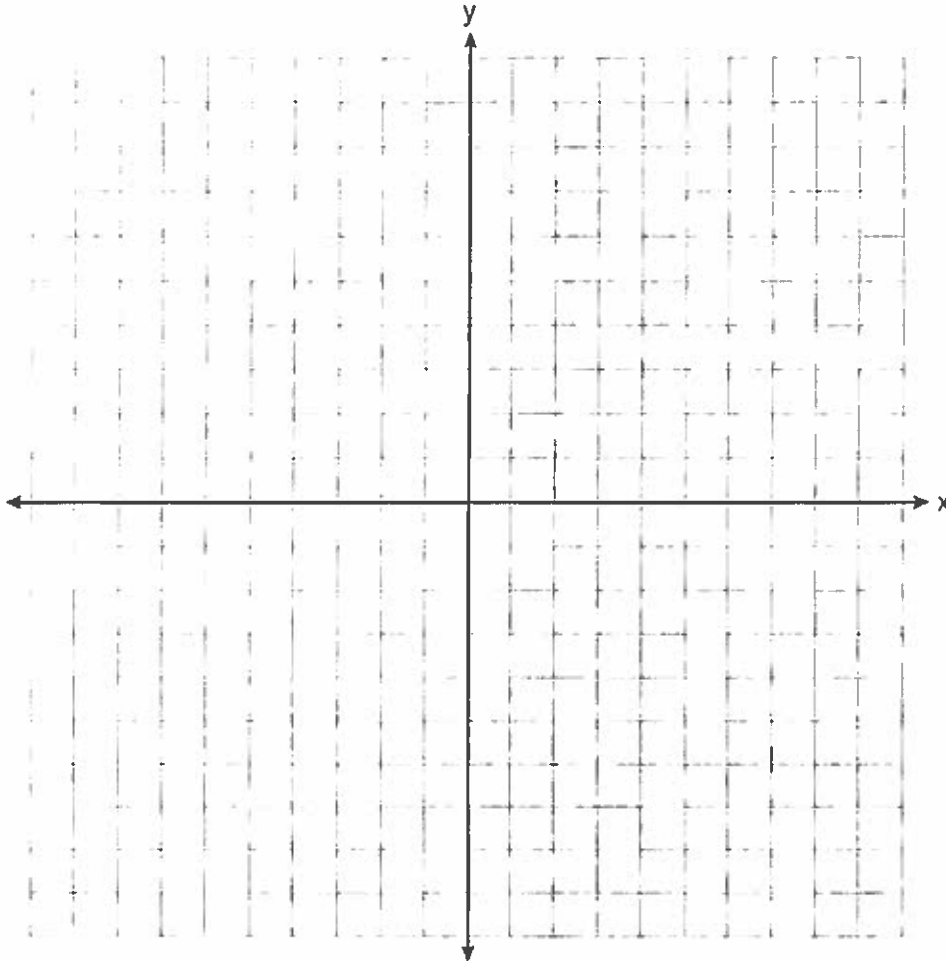
7) On the set of axes below, solve the following system of equations graphically for all values of x and y.

$$y = x^2 - 6x + 1$$
$$y + 2x = 6$$

$(-1, 8)$

$(5, -4)$
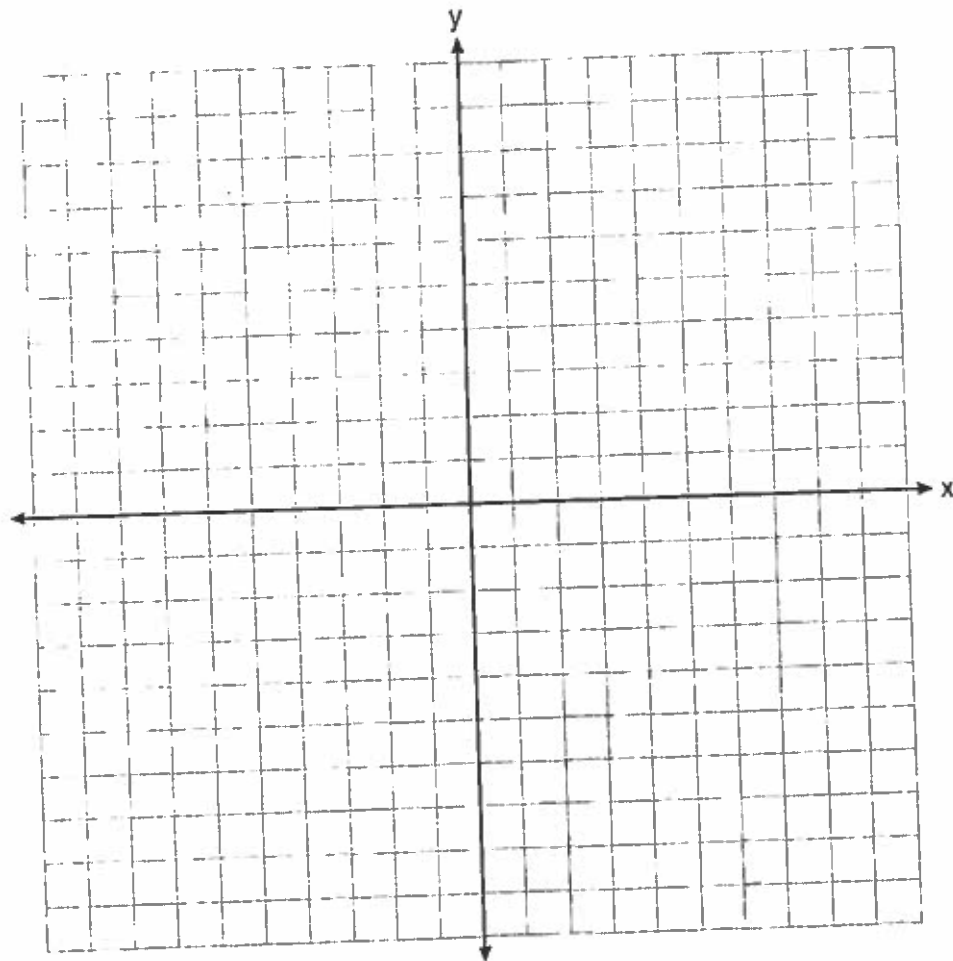
6) On the set of axes below, solve the following system of equations graphically. State the coordinates of the solution.

$$y = 4x - 1$$
$$2x + y = 5$$

$(1, 3)$
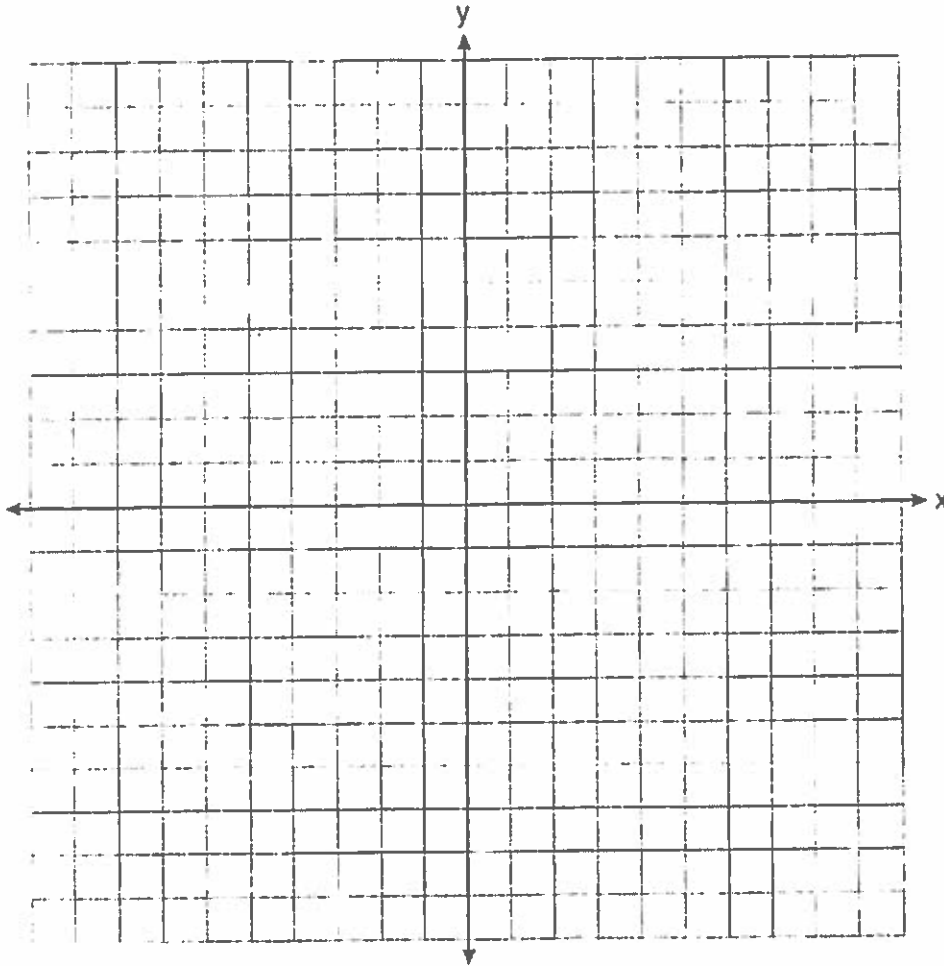
9) On the set of axes below, solve the following system of equations graphically for all values of x and y.

$$y = -x^2 - 4x + 12$$
$$y = -2x + 4$$

$(2,0)$ $(-4,12)$
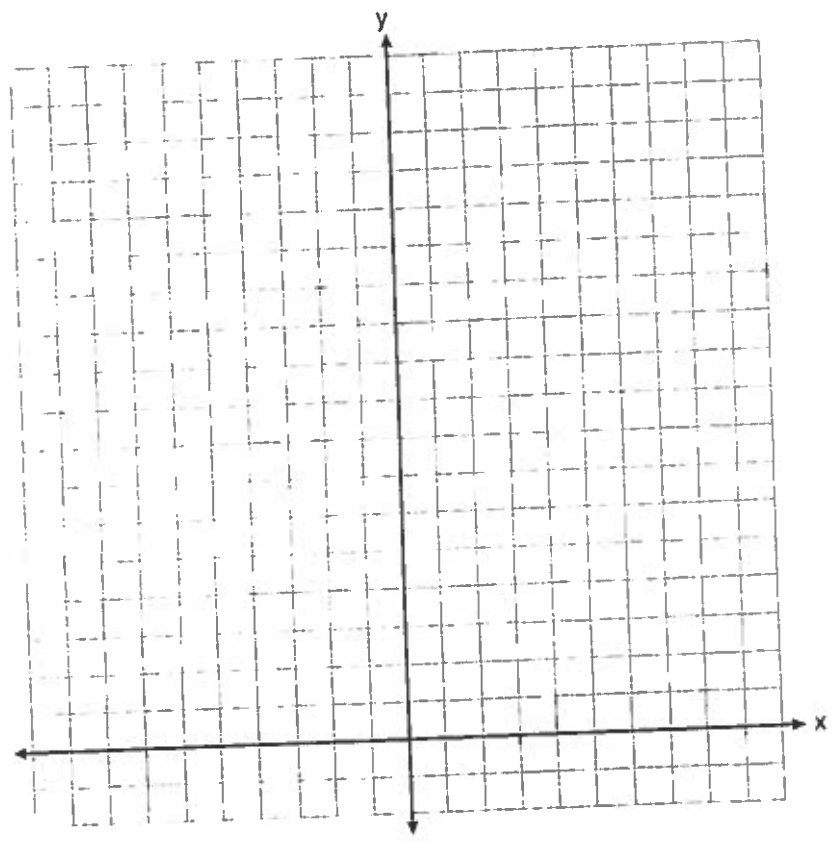
10.) On the set of axes below, solve the following system of equations graphically and state the coordinates of *all* points in the solution set.

$$y = -x^2 + 6x - 3$$
$$x + y = 7$$

$(2,5)$ $(5,2)$
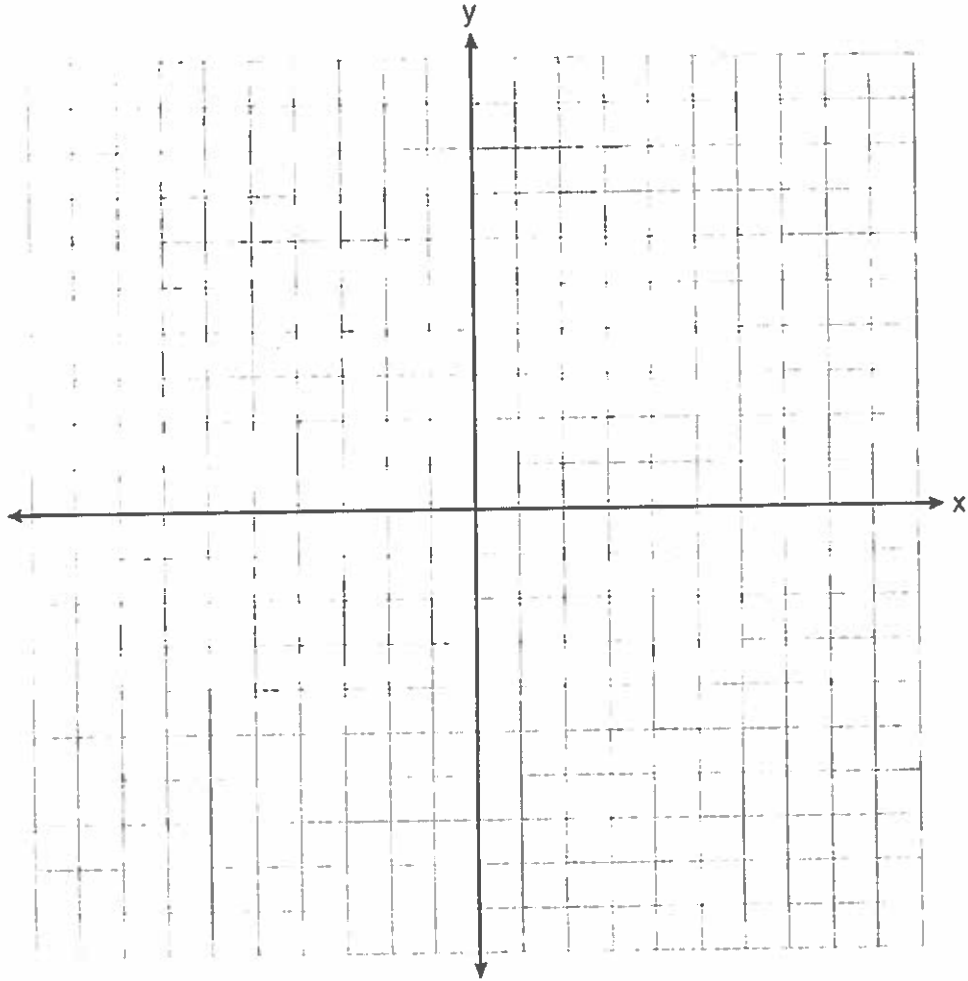
11.) On the grid below, solve the system of equations graphically for x and y.

$$4x - 2y = 10$$

$$y = -2x - 1$$

$(1, -3)$
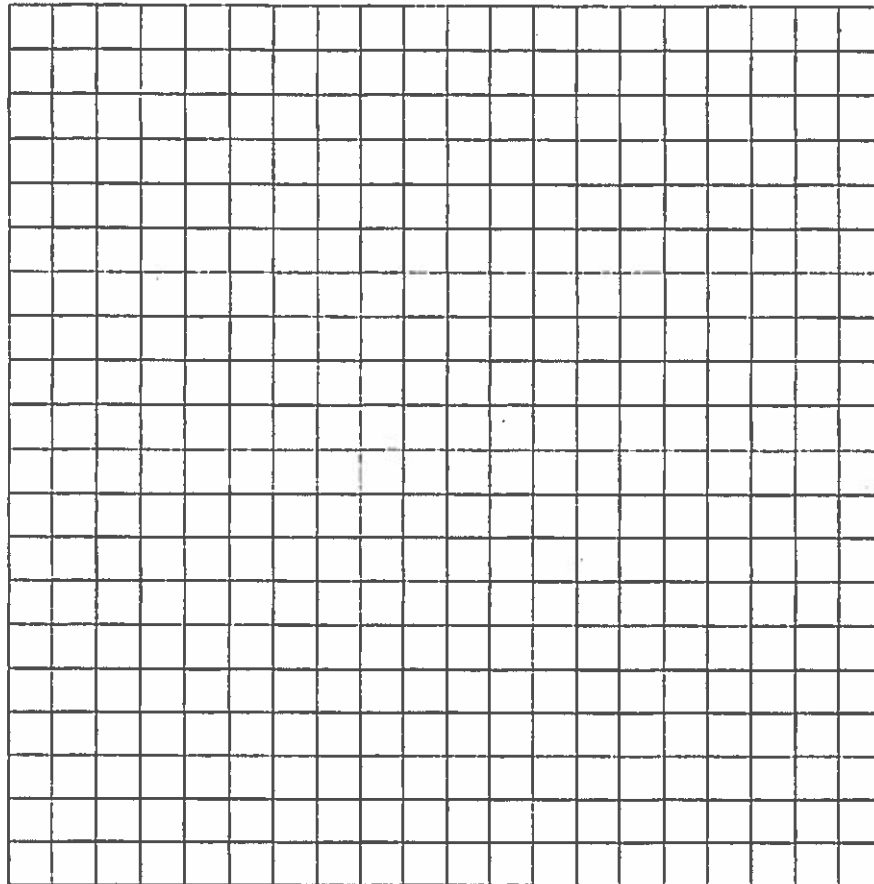
NAME: _____

Graphing Inequalities

1) Which graph represents the inequality $y > 3$?
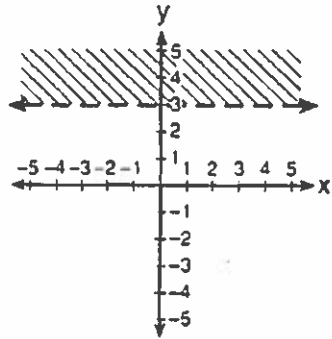
(1)
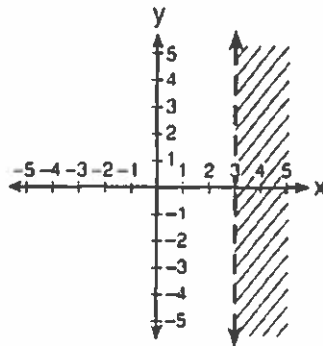
(3)
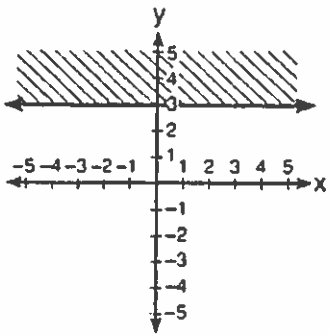
(2)
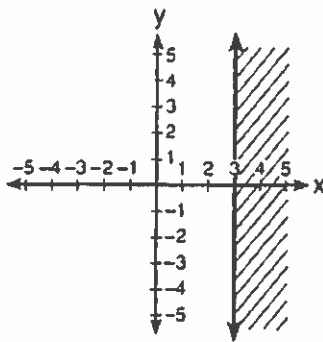
(4)

2) Which quadrant will be completely shaded in the graph of the inequality $y \leq 2x$?

(1) Quadrant I   (3) Quadrant III

(2) Quadrant II   (4) Quadrant IV

3.) Which graph represents the solution of $3y - 9 \leq 6x$?
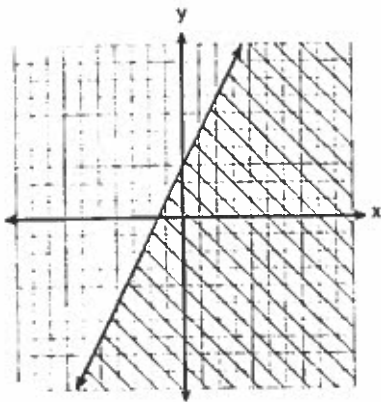
(1)
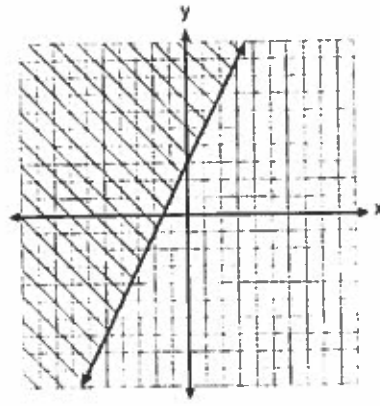
(3)
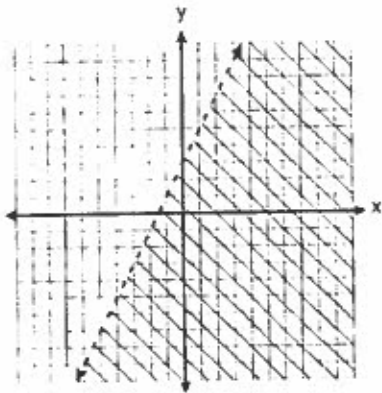
(2)
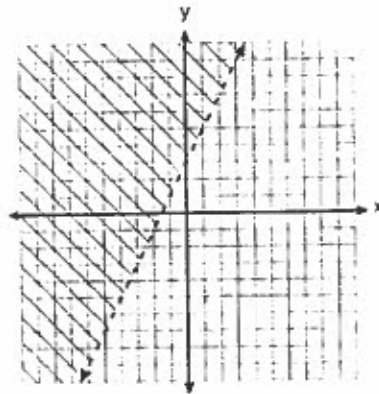
(4)

4) Graph the solution set for the inequality $4x - 3y > 9$ on the set of axes below. Determine if the point $(1,-3)$ is in the solution set. Justify your answer.
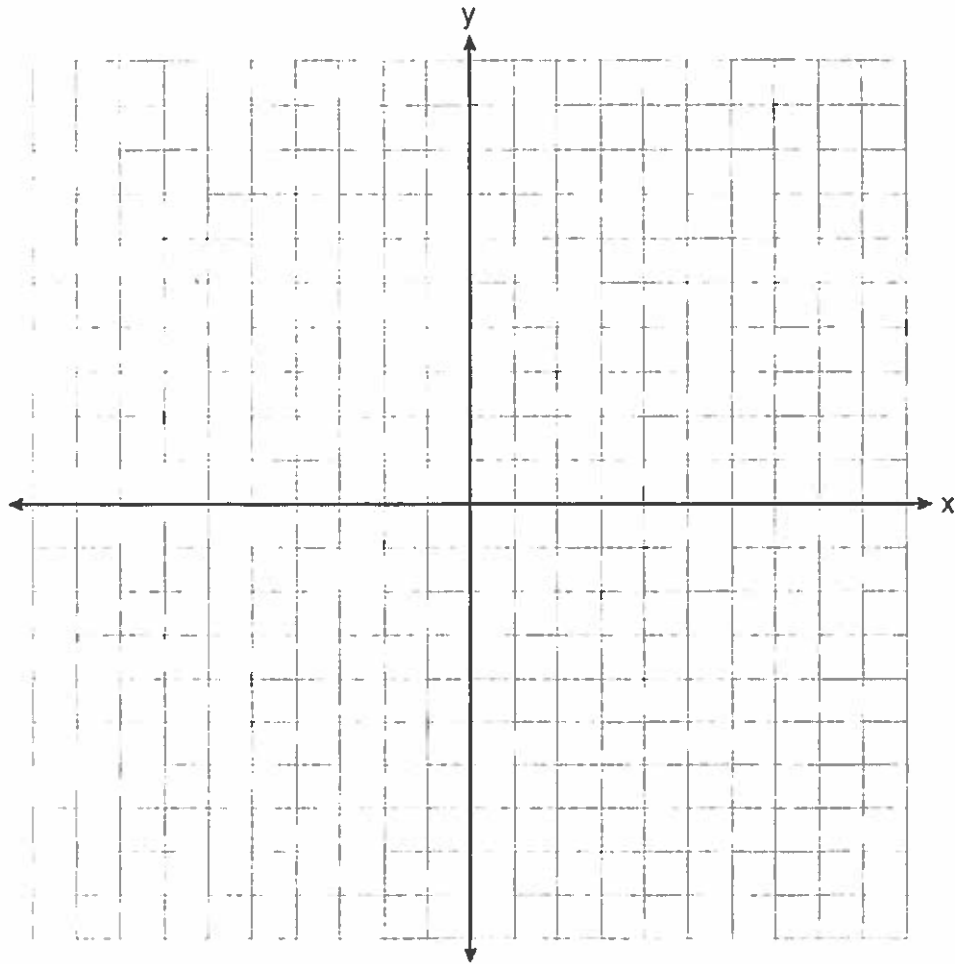
NAME: _____

Graphing Systems Inequalities

1) Which ordered pair is in the solution set of the system of inequalities shown in the graph below?

2

(1) $(-2,-1)$

(2) $(-2,2)$

(3) $(-2,-4)$

(4) $(2,-2)$
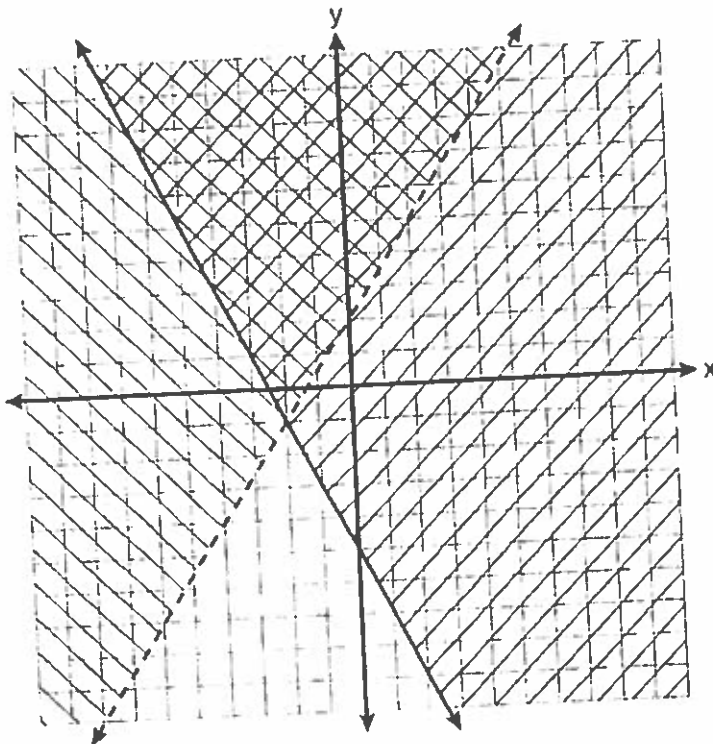
2) Which ordered pair is in the solution set of the system of linear inequalities graphed below?

(1) $(1,-4)$

(2) $(-5,7)$

(3) $(5,3)$
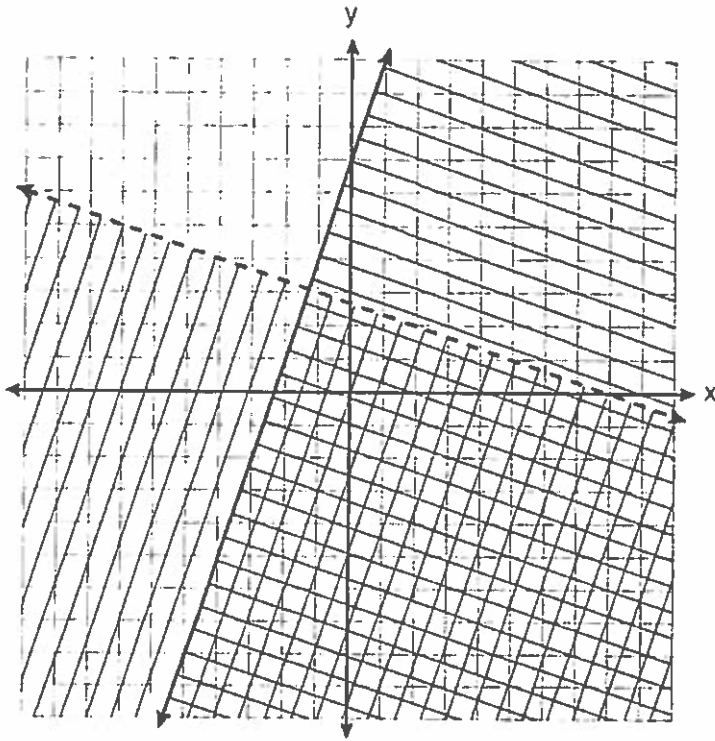
(4) $(-7,-2)$

3) Which ordered pair is in the solution set of the following system of linear inequalities?

$$y < 2x + 2$$
$$y \geq -x - 1$$

(1) $(0,3)$

(2) $(2,0)$

(3) $(-1,0)$

(4) $(-1,-4)$

2

4) On the set of axes below, solve the following system of inequalities graphically.

$$y < 2x + 1$$
$$y \geq -\frac{1}{3}x + 4$$

State the coordinates of a point in the solution set.
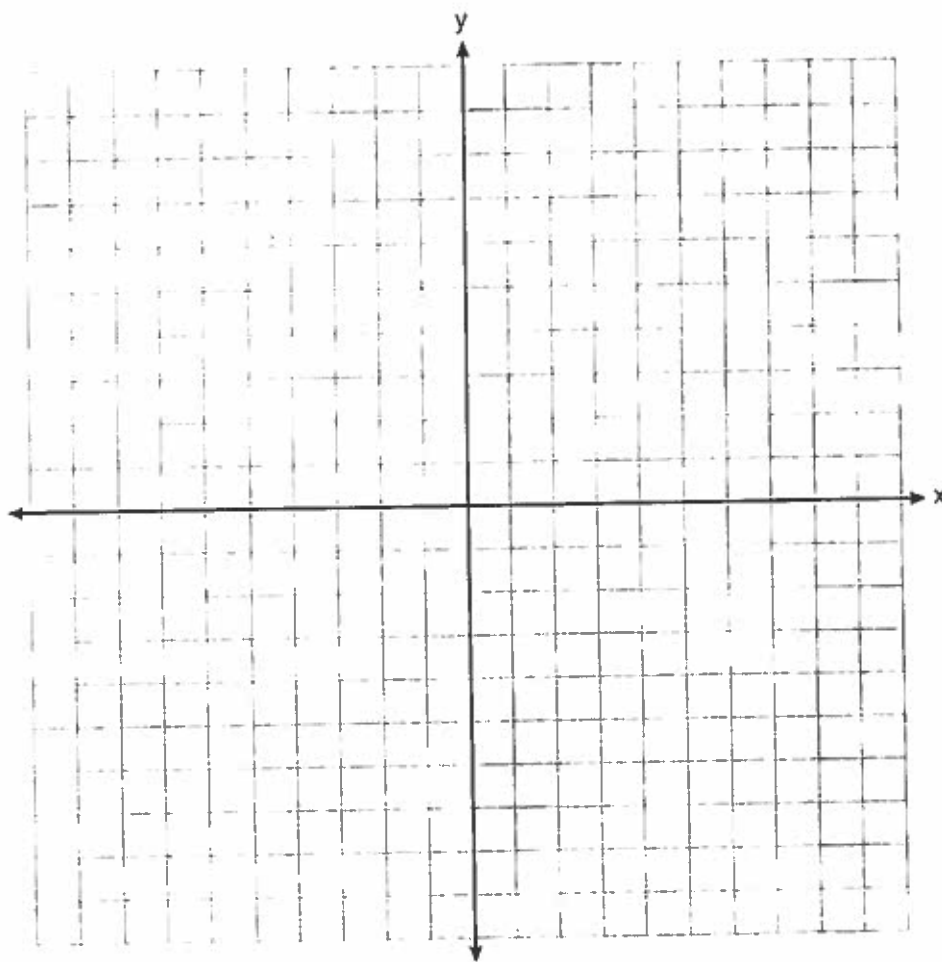
5) Graph the following system of inequalities on the set of axes shown below and label the solution set S.

$$y > -x + 2$$

$$y \le \frac{2}{3}x + 5$$
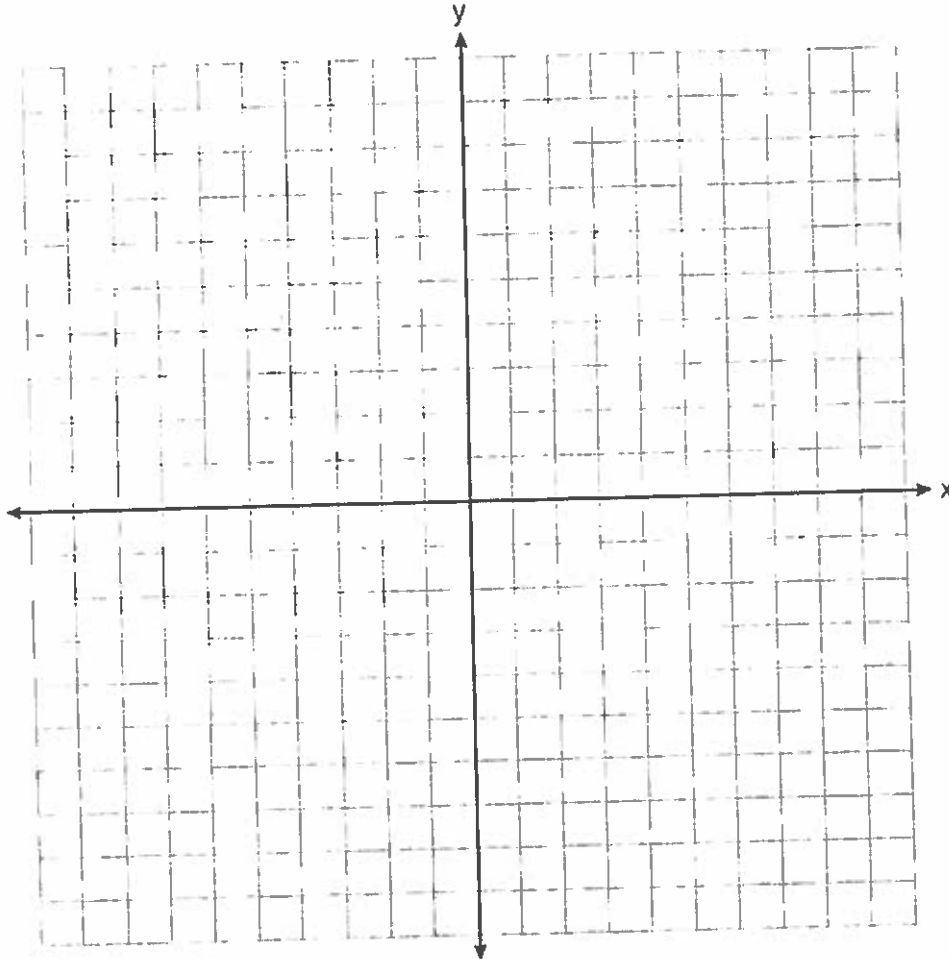
6) On the set of axes below, graph the following system of inequalities and state the coordinates of a point in the solution set.

$$2x - y \geq 6$$
$$x > 2$$
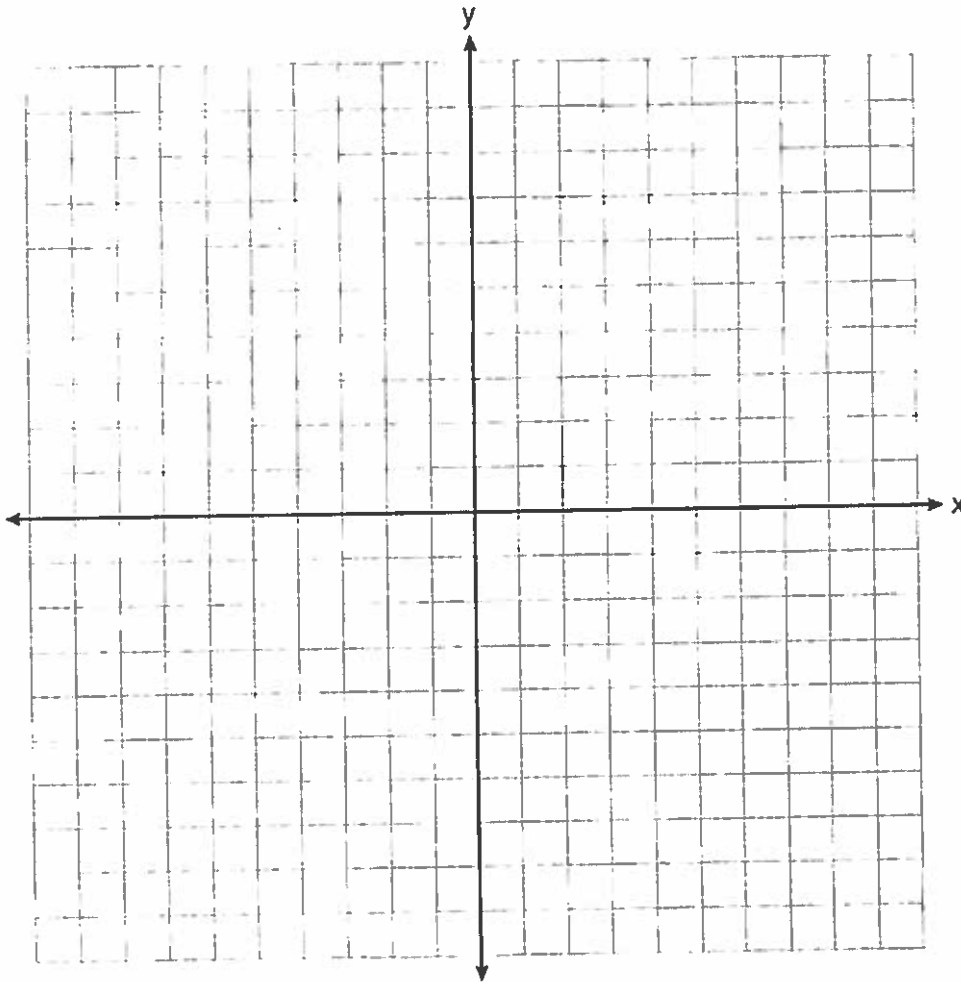
7.) Solve the following system of inequalities graphically on the set of axes below.

$$3x + y < 7$$
$$y \geq \tfrac{2}{3}x - 4$$

State the coordinates of a point in the solution set.
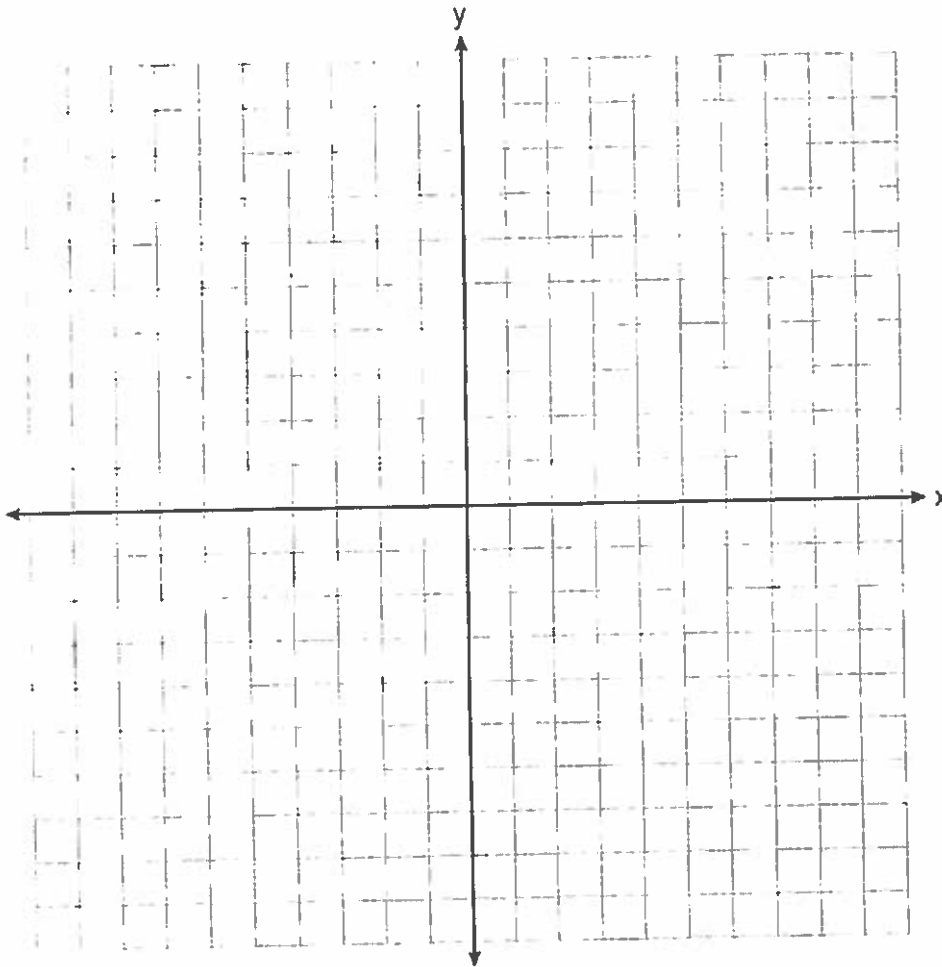
8.) Which ordered pair is in the solution set of the following system of inequalities?

$$y < \tfrac{1}{2}x + 4$$
$$y \geq -x + 1$$

(1) (−5,3)   (3) (3,−5)

(2) (0,4)   (4) (4,0)

4

NAME: _____

Area Involving quadratic Equations

1) A rectangle has an area of 24 square units. The width is 5 units less than the length. What is the length, in units, of the rectangle?

(1) 6

(3) 3

(2) 8

(4) 19

2

2) The width of a rectangle is 3 less than twice the length, x. If the area of the rectangle is 43 square feet, which equation can be used to find the length, in feet?

(1) $2x(x - 3) = 43$

(3) $2x + 2(2x - 3) = 43$

(2) $x(3 - 2x) = 43$

(4) $x(2x - 3) = 43$

4

3) The length of a rectangular room is 7 less than three times the width, w, of the room. Which expression represents the area of the room?

(1) $3w - 4$

(3) $3w^2 - 4w$

(2) $3w - 7$

(4) $3w^2 - 7w$

4

4) The length of a rectangle is 3 inches more than its width. The area of the rectangle is 40 square inches. What is the length, in inches, of the rectangle?

(1) 5

(3) 8.5

(2) 8

(4) 11.5

2

5) A plastic storage box in the shape of a rectangular prism has a length of $x + 3$, a width of $x - 4$, and a height of 5.
Represent the surface area of the box as a trinomial in terms of x.

$2x^2 + 18x - 34$

6) The area of a rectangle is represented by $x^2 - 5x - 24$. If the width of the rectangle is represented by $x - 8$, express the length of the rectangle as a binomial.

$x + 3$

7) A contractor needs 54 square feet of brick to construct a rectangular walkway. The length of the walkway is 15 feet more than the width.

Write an equation that could be used to determine the dimensions of the walkway. Solve this equation to find the length and width, in feet, of the walkway.
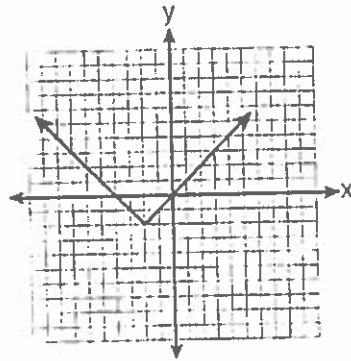
width = 3

length = 18

Exponential vs. Absolute Functions

Which graph represents an exponential equation?
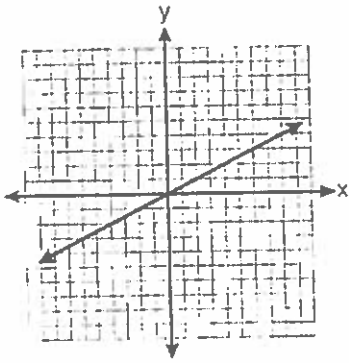
(1)

(3)
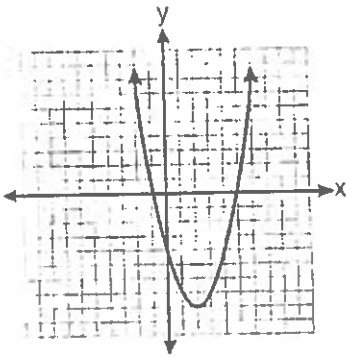
(2)
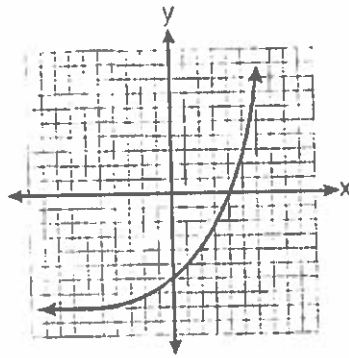
(4)

4

Which equation is represented by the graph below?

(1) $y = x^2 - 3$ (3) $y = |x| - 3$

(2) $y = (x - 3)^2$ (4) $y = |x - 3|$

2
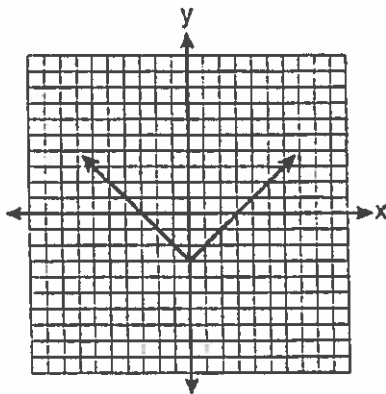
On the set of axes below, draw the graph of $y = 2^x$ over the interval $-1 \le x \le 3$.

Will this graph ever intersect the x-axis? Justify your answer.
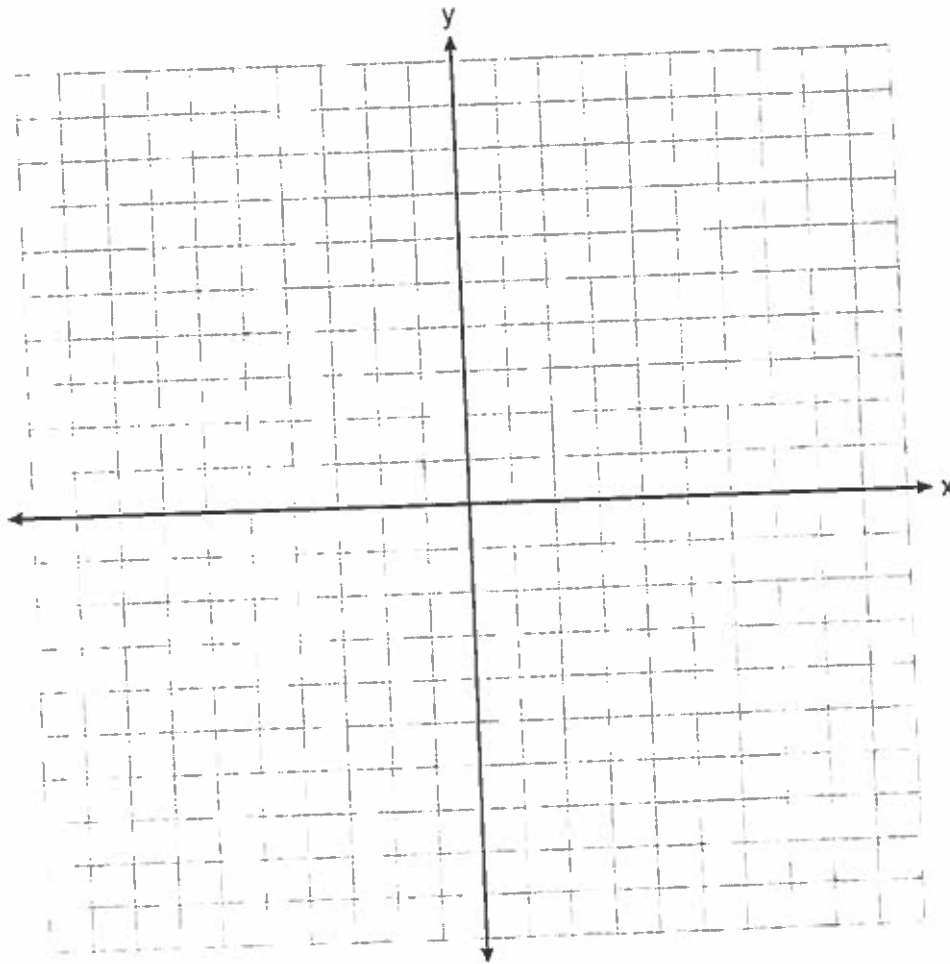
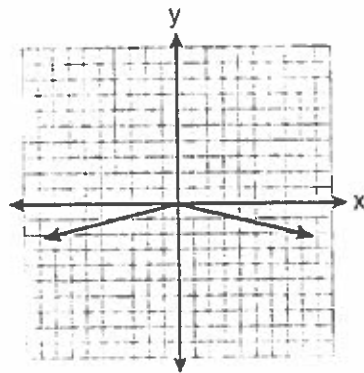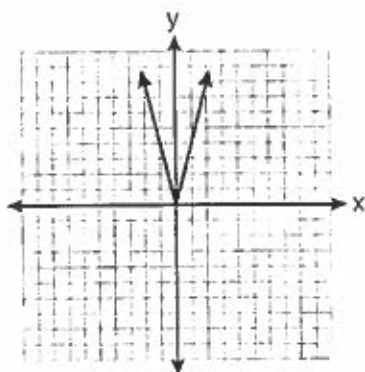The graph of the equation $y = |x|$ is shown in the diagram below.
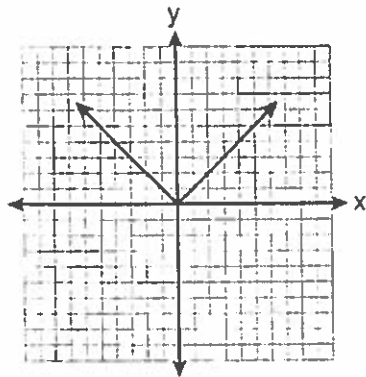
Which diagram could represent a graph of the equation $y = a|x|$ when $-1 < a < 0$?
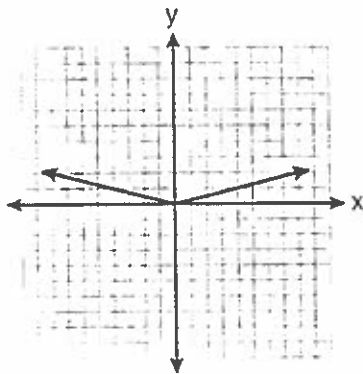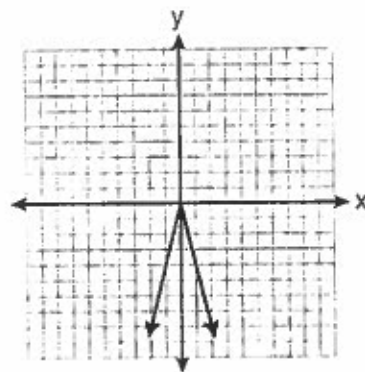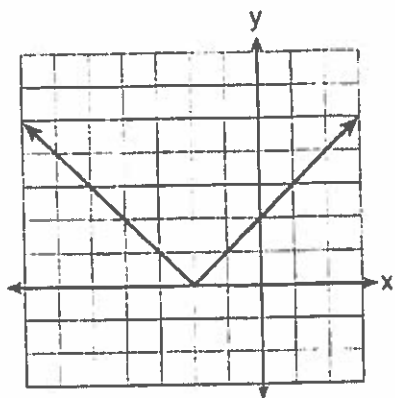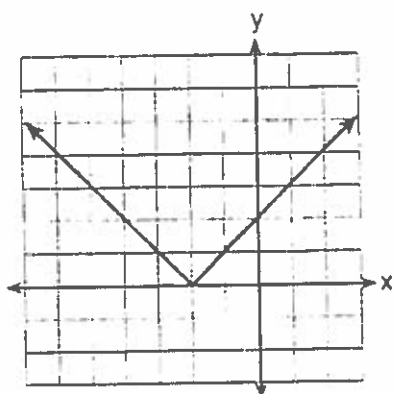

(1)

(3)

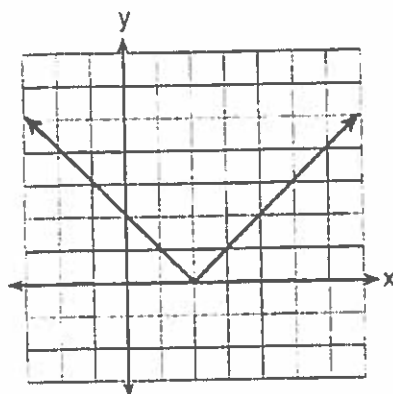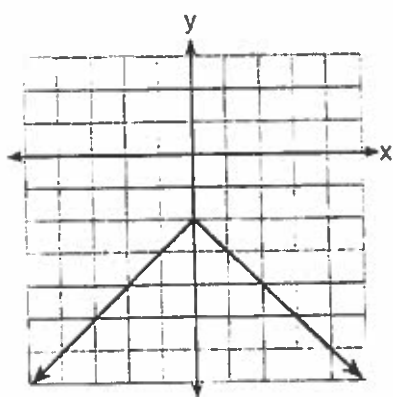

(2)

(4)

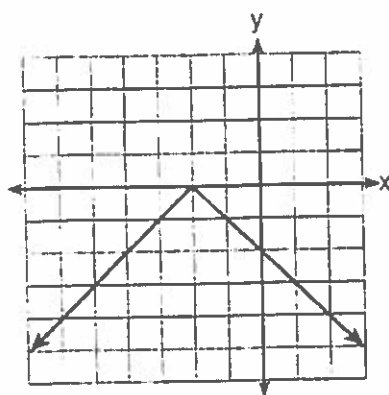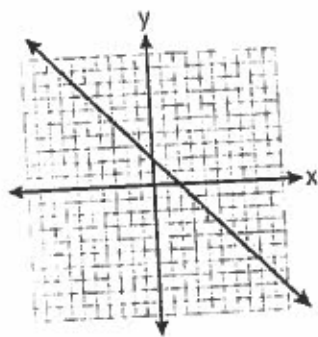The graph of $y = |x + 2|$ is shown below.
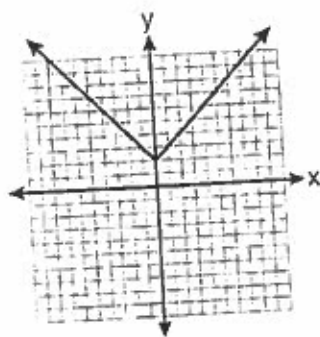

Which graph represents $y = -|x + 2|$?

(1)

(3)

(2)

(4)

Which is the graph of $y = |x| + 2$?

(1)

(3)

(2)

(4)

3
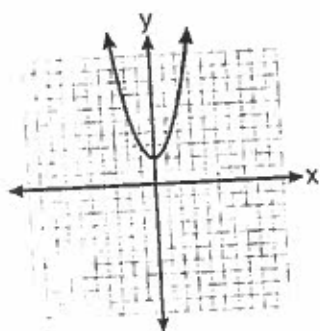
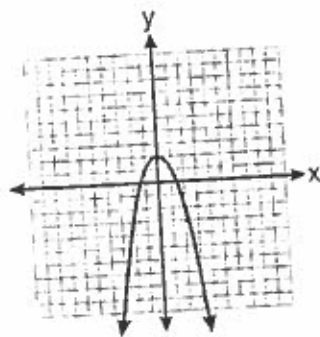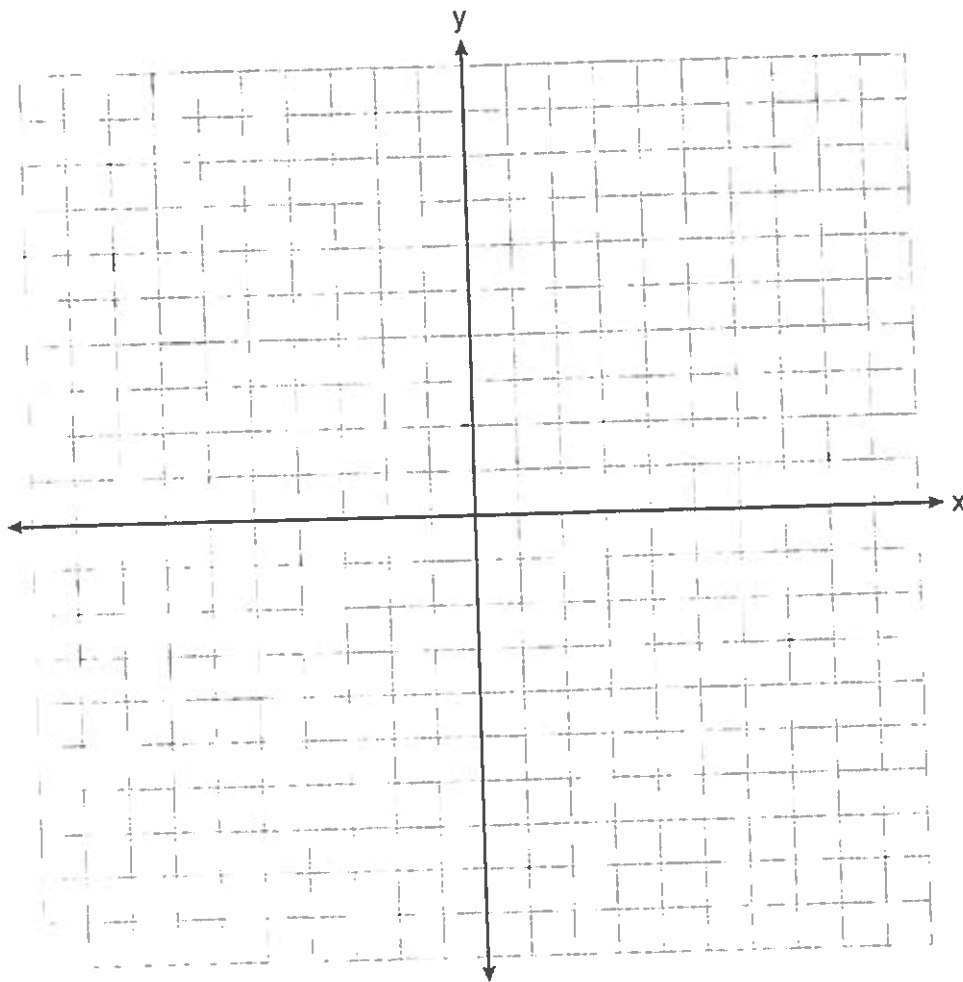On the set of axes below, graph and label the equations $y = |x|$ and $y = 3|x|$ for the interval $-3 \leq x \leq 3$.

Explain how changing the coefficient of the absolute value from 1 to 3 affects the graph.
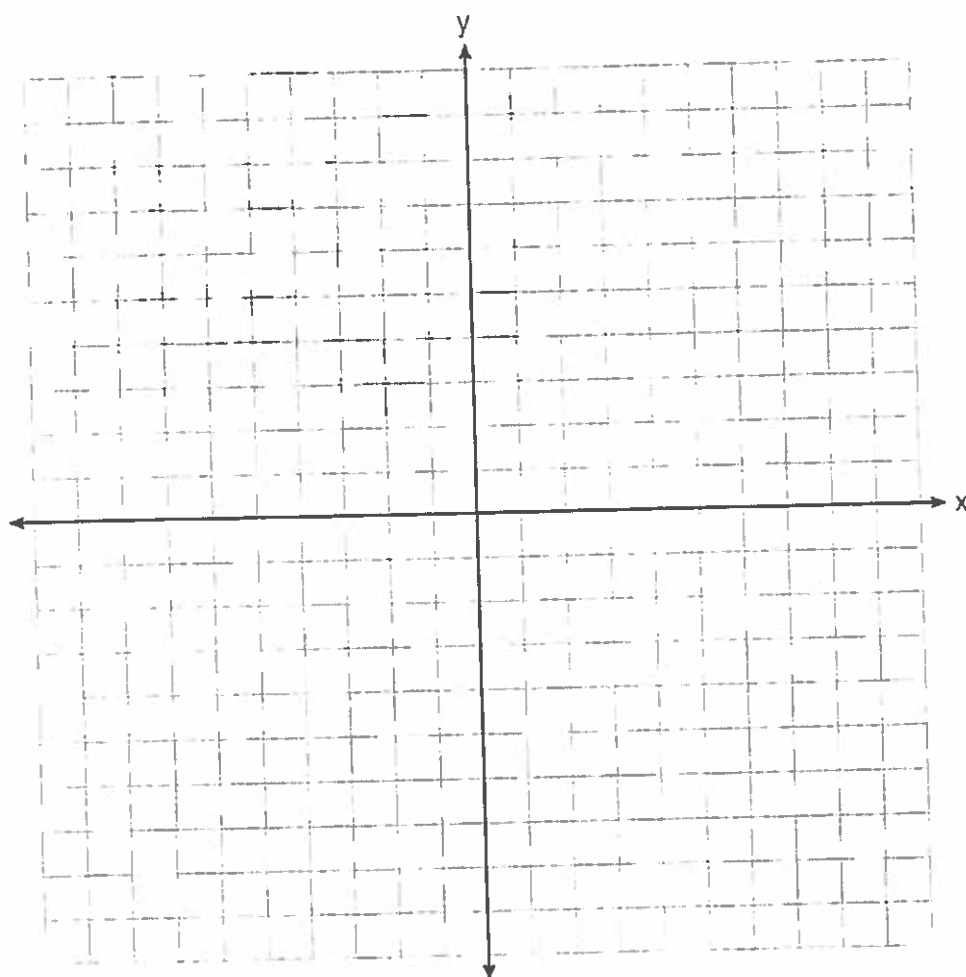
Graph and label the following equations on the set of axes below.

$$y = |x|$$

$$y = \left|\frac{1}{2}x\right|$$

Explain how *decreasing* the coefficient of x affects the graph of the equation $y = |x|$.

NAME: _____

Set Theory

Which interval notation represents the set of all real numbers greater than 2 and less than or equal to 20?

(1) (2,20)   (3) [2,20)

(2) (2,20]   (4) [2,20]

2

Which interval notation represents the set of all numbers greater than or equal to 5 and less than 12?

(1) [5, 12)   (3) (5, 12)

(2) (5, 12]   (4) [5, 12]

1

In interval notation, the set of all real numbers greater than -6 and less than or equal to 14 is represented by

(1) (−6, 14)   (3) (−6, 14]

(2) [−6, 14)   (4) [−6, 14]

3

Which set builder notation represents $\{-2, -1, 0, 1, 2, 3\}$?

(1) $\{x | -3 \le x \le 3$, where x is an integer$\}$

(2) $\{x | -3 < x \le 4$, where x is an integer$\}$

(3) $\{x | -2 < x < 3$, where x is an integer$\}$

(4) $\{x | -2 \le x < 4$, where x is an integer$\}$

4

Which set-builder notation describes $\{-3, -2, -1, 0, 1, 2\}$?

(1) $\{x | -3 \le x < 2$, where x is an integer$\}$

(2) $\{x | -3 < x \le 2$, where x is an integer$\}$

(3) $\{x | -3 < x < 2$, where x is an integer$\}$

(4) $\{x | -3 \le x \le 2$, where x is an integer$\}$

4

Which notation describes $\{1, 2, 3\}$?

(1) $\{x | 1 \le x < 3$, where x is an integer$\}$

(2) $\{x | 0 < x \le 3$, where x is an integer$\}$

(3) $\{x | 1 < x < 3$, where x is an integer$\}$

(4) $\{x | 0 \le x \le 3$, where x is an integer$\}$

2

The set {11,12} is equivalent to

(1) {x|11 < x < 12, where x is an integer}
(2) {x|11 < x ≤ 12, where x is an integer}
(3) {x|10 ≤ x < 12, where x is an integer}
(4) {x|10 < x ≤ 12, where x is an integer}

4

The set {1,2,3,4} is equivalent to

(1) {x | 1 < x < 4, where x is a whole number}
(2) {x | 0 < x < 4, where x is a whole number}
(3) {x | 0 < x ≤ 4, where x is a whole number}
(4) {x | 1 < x ≤ 4, where x is a whole number}

3

Consider the set of integers greater than –2 and less than 6. A subset of this set is the positive factors of 5. What is the complement of this subset?

(1) {0, 2, 3, 4}

(2) {–1, 0, 2, 3, 4}

(3) {–2, –1, 0, 2, 3, 4, 6}

(4) {–2, –1, 0, 1, 2, 3, 4, 5, 6}

2

Twelve players make up a high school basketball team. The team jerseys are numbered 1 through 12. The players wearing the jerseys numbered 3, 6, 7, 8, and 11 are the only players who start a game. Using set notation, list the complement of this subset.

{ 1, 2, 4, 5, 9, 10, 12}

Given:

Set U = {S, O, P, H, I, A}
Set B = {A, I, O}

If set B is a subset of set U, what is the complement of set B?

(1) {O, P, S}

(2) {I, P, S}

(3) {A, H, P}

(4) {H, P, S}

4

Given:

A = {All even integers from 2 to 20, inclusive}
B = {10, 12, 14, 16, 18}

What is the complement of set B within the universe of set A?

(1) {4, 6, 8}

(2) {2, 4, 6, 8}

(3) {4, 6, 8, 20}

(4) {2, 4, 6, 8, 20}

4

Given:

$$U = \{1, 2, 3, 4, 5, 6, 7, 8\}$$
$$B = \{2, 3, 5, 6\}$$

Set B is a subset of set U. What is the complement of set B?

(1) {}

(3) {1, 4, 7, 8}

(2) {2, 3, 5, 6}

(4) {1, 2, 3, 4, 5, 6, 7, 8}

3

If the universal set is {pennies, nickels, dimes, quarters}, what is the complement of the set {nickels}?

(1) {}

(2) {pennies, quarters}

(3) {pennies, dimes, quarters}

(4) {pennies, nickels, dimes, quarters}

3

Given: A = {3, 6, 9, 12, 15}
        B = {2, 4, 6, 8, 10, 12}

What is the union of sets A and B?

(1) {6}

(3) {2, 3, 4, 8, 9, 10, 15}

(2) {6, 12}

(4) {2, 3, 4, 6, 8, 9, 10, 12, 15}

4

Given:

$$A = \{2, 4, 5, 7, 8\}$$
$$B = \{3, 5, 8, 9\}$$

What is A ∪ B?

(1) {5}

(3) {2, 3, 4, 7, 9}

(2) {5, 8}

(4) {2, 3, 4, 5, 7, 8, 9}

4

Given:

$$X = \{1, 2, 3, 4\}$$
$$Y = \{2, 3, 4, 5\}$$
$$Z = \{3, 4, 5, 6\}$$

What is the intersection of sets X, Y, and Z?

(1) {3, 4}

(3) {3, 4, 5}

(2) {2, 3, 4}

(4) {1, 2, 3, 4, 5, 6}

1

Given:

$Q = \{0, 2, 4, 6\}$

$W = \{0, 1, 2, 3\}$

$Z = \{1, 2, 3, 4\}$

What is the intersection of sets Q, W, and Z?

(1) $\{2\}$

(2) $\{0, 2\}$

(3) $\{1, 2, 3\}$

(4) $\{0, 1, 2, 3, 4, 6\}$

Maureen tracks the range of outdoor temperatures over three days. She records the following information.

Day 1:

−20°F   40°F

Day 2:

0°F   50°F

Day 3:

−23°F   45°F
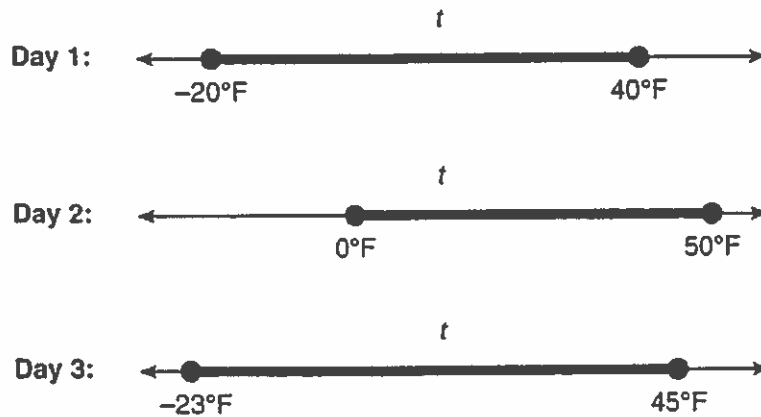
Express the intersection of the three sets as an inequality in terms of temperature, t.

$$0 \le t \le 40$$

Which set represents the intersection of sets A, B, and C shown in the diagram below?

(1) $\{3, 4, 5, 6, 7\}$

(2) $\{2\}$
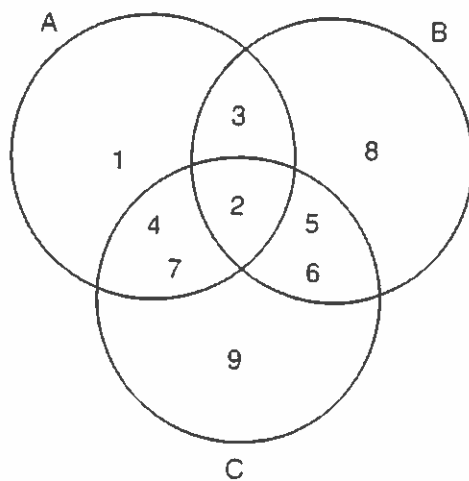
(3) $\{2, 3, 4, 5, 6, 7\}$

(4) $\{1, 2, 3, 4, 5, 6, 7, 8, 9\}$

NAME: _____

Simplest Radical Form

1.) What is $3\sqrt{250}$ expressed in simplest radical form?

(1) $5\sqrt{10}$ (3) $15\sqrt{10}$

(2) $8\sqrt{10}$ (4) $75\sqrt{10}$

3

2.) When $5\sqrt{20}$ is written in simplest radical form, the result is $k\sqrt{5}$. What is the value of k?

(1) 20   (3) 7

(2) 10   (4) 4

2

3.) Express $-3\sqrt{48}$ in simplest radical form.

$-12\sqrt{3}$

4.) What is $\sqrt{32}$ expressed in simplest radical form?

(1) $16\sqrt{2}$ (3) $4\sqrt{8}$

(2) $4\sqrt{2}$ (4) $2\sqrt{8}$

2

5.) What is $\sqrt{72}$ expressed in simplest radical form?

(1) $2\sqrt{18}$ (3) $6\sqrt{2}$

(2) $3\sqrt{8}$ (4) $8\sqrt{3}$

3

6.) What is $2\sqrt{45}$ expressed in simplest radical form?

(1) $3\sqrt{5}$ (3) $6\sqrt{5}$

(2) $5\sqrt{5}$ (4) $18\sqrt{5}$

3

7.) What is $\frac{\sqrt{32}}{4}$ expressed in simplest radical form?

(1) $\sqrt{2}$ (3) $\sqrt{8}$

(2) $4\sqrt{2}$ (4) $\frac{\sqrt{8}}{2}$

1

8) Express the product of $3\sqrt{20}(2\sqrt{5} - 7)$ in simplest radical form.

$$60 - 42\sqrt{5}$$

9) The expression $\sqrt{72} - 3\sqrt{2}$ written in simplest radical form is
   (1) $5\sqrt{2}$ (3) $3\sqrt{2}$
   (2) $3\sqrt{6}$ (4) $\sqrt{6}$

3

10.) Express $\frac{16\sqrt{21}}{2\sqrt{7}} - 5\sqrt{12}$ in simplest radical form.

$$-2\sqrt{3}$$

11) What is $3\sqrt{2} + \sqrt{8}$ expressed in simplest radical form?
   (1) $3\sqrt{10}$ (3) $5\sqrt{2}$
   (2) $3\sqrt{16}$ (4) $7\sqrt{2}$

3

12) The expression $6\sqrt{50} + 6\sqrt{2}$ written in simplest radical form is

   (1) $6\sqrt{52}$ (3) $17\sqrt{2}$
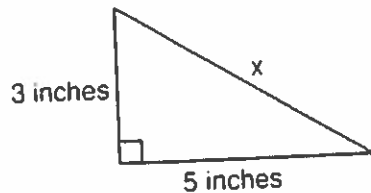   (2) $12\sqrt{52}$ (4) $36\sqrt{2}$
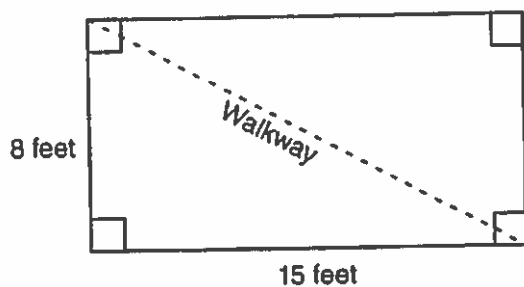
4

NAME: _____

Pythagorean Thm

1) What is the value of x, in inches, in the right triangle below?

3 inches
x
5 inches

(1) $\sqrt{15}$

(2) 8

(3) $\sqrt{34}$

(4) 4

3

2) Nancy's rectangular garden is represented in the diagram below.

8 feet
Walkway
15 feet

If a diagonal walkway crosses her garden, what is its length, in feet?

(1) 17

(2) 22

(3) $\sqrt{161}$

(4) $\sqrt{529}$

1

3) The end of a dog's leash is attached to the top of a 5-foot-tall fence post, as shown in the diagram below. The dog is 7 feet away from the base of the fence post.
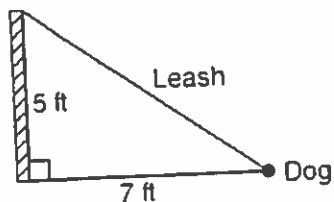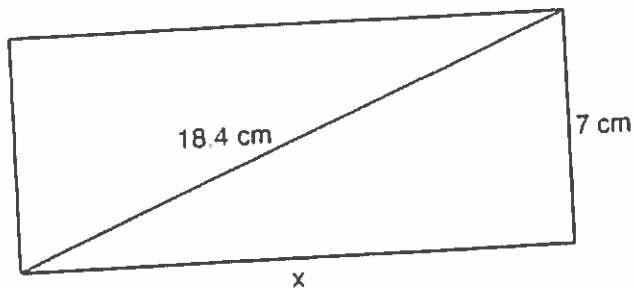
Leash
5 ft
7 ft
Dog

How long is the leash, to the *nearest tenth of a foot?*

(1) 4.9

(2) 5.6

(3) 9.0

(4) 12.0

2

4) The rectangle shown below has a diagonal of 18.4 cm and a width of 7 cm.

18.4 cm

7 cm

x

To the *nearest centimeter*, what is the length, x, of the rectangle?

(1) 11

(3) 20

(2) 17

(4) 25

2

5) Campsite A and campsite B are located directly opposite each other on the shores of Lake Omega, as shown in the diagram below. The two campsites form a right triangle with Sam's position, S. The distance from campsite B to Sam's position is 1,300 yards, and campsite A is 1,700 yards from his position.

A

1,700 yards

Lake Omega

B   1,300 yards   S
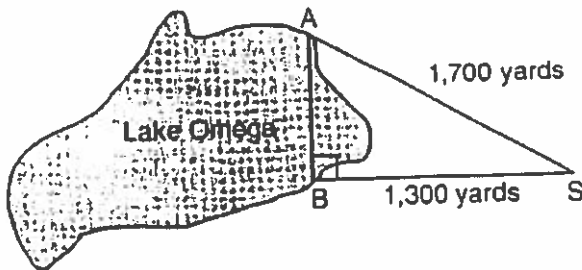
What is the distance from campsite A to campsite B, to the *nearest yard*?

(1) 1,095

(3) 2,140

(2) 1,096

(4) 2,141

1

6) The legs of an isosceles right triangle each measure 10 inches. What is the length of the hypotenuse of this triangle, to the *nearest tenth of an inch*?

(1) 6.3

(3) 14.1

(2) 7.1

(4) 17.1

3

7) The length of the hypotenuse of a right triangle is 34 inches and the length of one of its legs is 16 inches. What is the length, in inches, of the other leg of this right triangle?

(1) 16

(2) 18

(3) 25

(4) 30

4

8) Don placed a ladder against the side of his house as shown in the diagram below.

Ladder
20 ft

19.5 ft

x
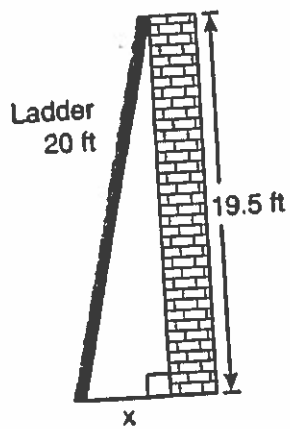
Which equation could be used to find the distance, x, from the foot of the ladder to the base of the house?

(1) $x = 20 - 19.5$

(2) $x = 20^2 - 19.5^2$

(3) $x = \sqrt{20^2 - 19.5^2}$

(4) $x = \sqrt{20^2 + 19.5^2}$

3

Trig of a Right Triangle

1) Which equation could be used to find the measure of one acute angle in the right triangle shown below?
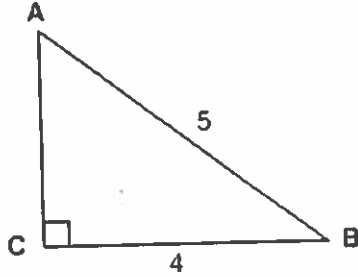
(1) $\sin A = \frac{4}{5}$

(3) $\cos B = \frac{5}{4}$

(2) $\tan A = \frac{5}{4}$

(4) $\tan B = \frac{4}{5}$

2) The diagram below shows right triangle UPC.

Which ratio represents the sine of $\angle U$?

(1) $\frac{15}{8}$

(3) $\frac{8}{15}$

(2) $\frac{15}{17}$

(4) $\frac{8}{17}$

2

3) The diagram below shows right triangle ABC.
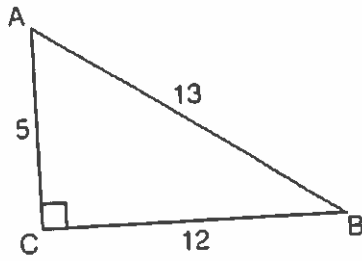
Which ratio represents the tangent of ∠ABC?

(1) $\frac{5}{13}$

(3) $\frac{12}{13}$

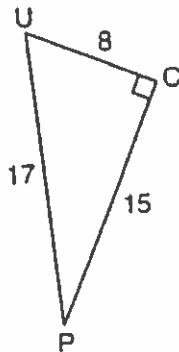(2) $\frac{5}{12}$

(4) $\frac{12}{5}$

2

4) Right triangle ABC has legs of 8 and 15 and a hypotenuse of 17, as shown in the diagram below.

The value of the tangent of ∠B is

(1) 0.4706

(3) 0.8824

(2) 0.5333

(4) 1.8750

2

5) In △ABC, the measure of ∠B = 90°, AC = 50, AB = 48, and BC = 14. Which ratio represents the tangent of ∠A?

(1) $\frac{14}{50}$

(3) $\frac{48}{50}$

(2) $\frac{14}{48}$

(4) $\frac{48}{14}$

2

6) Which equation shows a correct trigonometric ratio for angle A in the right triangle below?
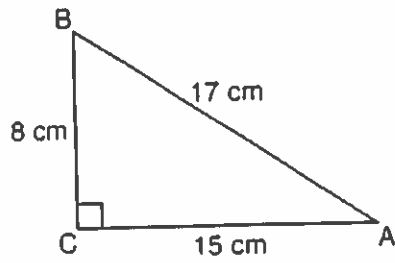
(1) $\sin A = \dfrac{15}{17}$

(2) $\tan A = \dfrac{8}{17}$

(3) $\cos A = \dfrac{15}{17}$

(4) $\tan A = \dfrac{15}{8}$

3

7) Which ratio represents $\sin x$ in the right triangle shown below?
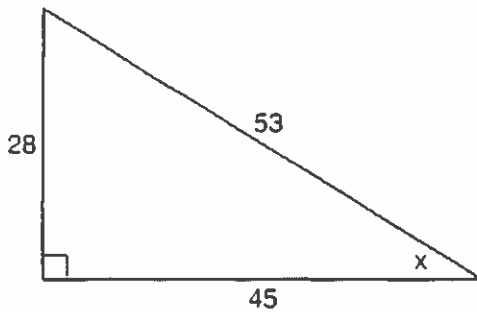

(1) $\dfrac{28}{53}$

(2) $\dfrac{28}{45}$
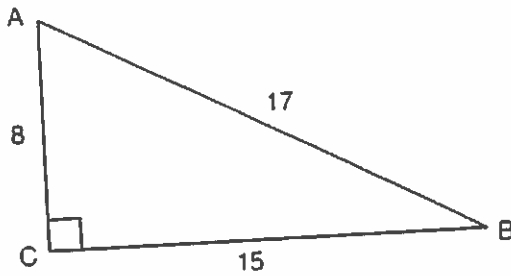
(3) $\dfrac{45}{53}$

(4) $\dfrac{53}{28}$

1

8) The diagram below shows right triangle LMP.
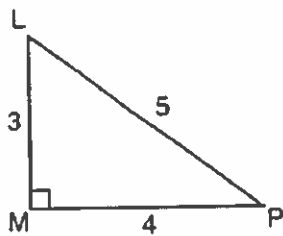
Which ratio represents the tangent of $\angle PLM$?

(1) $\dfrac{3}{4}$

(2) $\dfrac{3}{5}$

(3) $\dfrac{4}{3}$

(4) $\dfrac{5}{4}$

3

9) In the right triangle shown in the diagram below, what is the value of x to the *nearest whole number*?
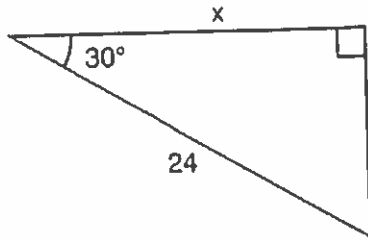
- (1) 12
- (2) 14
- (3) 21
- (4) 28

3

10) An 8-foot rope is tied from the top of a pole to a stake in the ground, as shown in the diagram below.
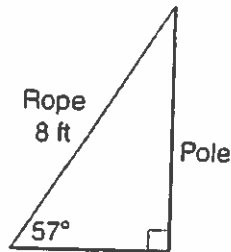
9) If the rope forms a 57° angle with the ground, what is the height of the pole, to the *nearest tenth of a foot*?

- (1) 4.4
- (2) 6.7
- (3) 9.5
- (4) 12.3

2

11) A tree casts a 25-foot shadow on a sunny day, as shown in the diagram below.
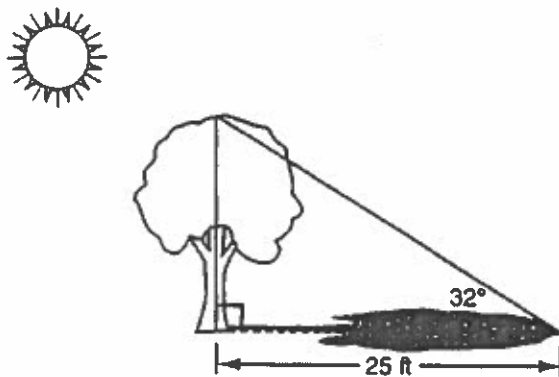
If the angle of elevation from the tip of the shadow to the top of the tree is 32°, what is the height of the tree to the *nearest tenth of a foot*?

- (1) 13.2
- (2) 15.6
- (3) 21.2
- (4) 40.0

12) As shown in the diagram below, a ladder 5 feet long leans against a wall and makes an angle of 65° with the ground. Find, to the *nearest tenth of a foot*, the distance from the wall to the base of the ladder.

5 feet

65°
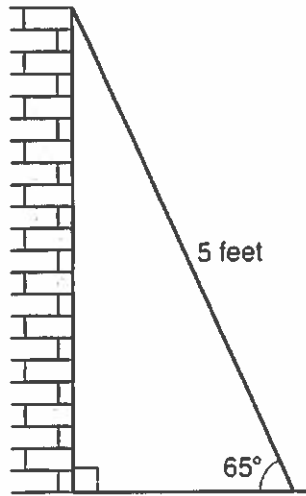
2.1

13) A stake is to be driven into the ground away from the base of a 50-foot pole, as shown in the diagram below. A wire from the stake on the ground to the top of the pole is to be installed at an angle of elevation of 52°.

Wire

50 ft

52° Stake
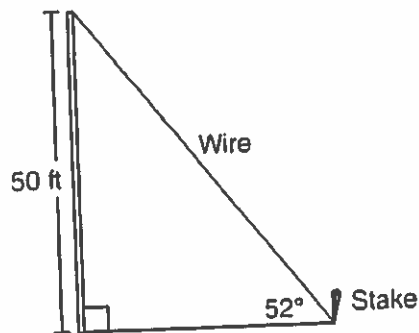
How far away from the base of the pole should the stake be driven in, to the *nearest foot*?

39

What will be the length of the wire from the stake to the top of the pole, to the *nearest foot*?

63

14) A hot-air balloon is tied to the ground with two taut (straight) ropes, as shown in the diagram below. One rope is directly under the balloon and makes a right angle with the ground. The other rope forms an angle of 50° with the ground.

Hot-air balloon

110 feet

50°
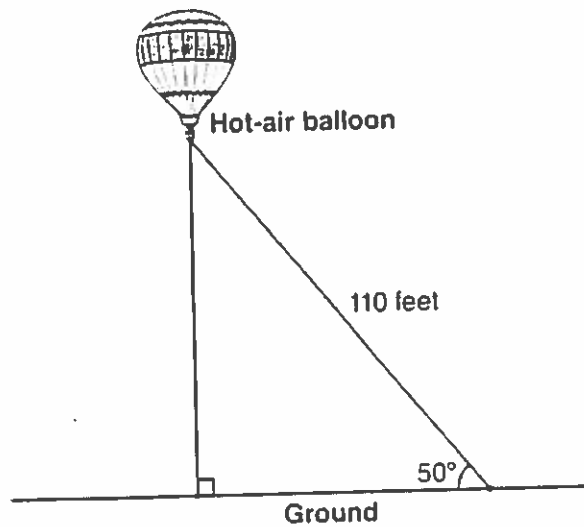
Ground

Determine the height, to the *nearest foot*, of the balloon directly above the ground.

84

Determine the distance, to the *nearest foot*, on the ground between the two ropes.

71

15.) A right triangle contains a 38° angle whose adjacent side measures 10 centimeters. What is the length of the hypotenuse, to the *nearest hundredth of a centimeter*?

(1) 7.88

(2) 12.69

(3) 12.80

(4) 16.24

2

16) The center pole of a tent is 8 feet long, and a side of the tent is 12 feet long as shown in the diagram below.

12 ft   8 ft

A
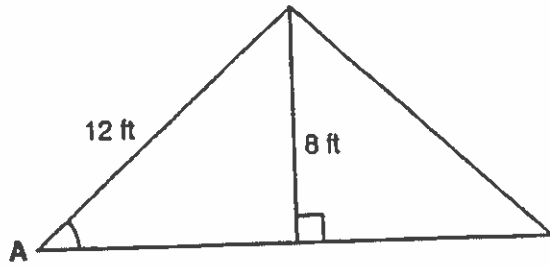
If a right angle is formed where the center pole meets the ground, what is the measure of angle A to the *nearest degree*?

(1) 34   (3) 48

(2) 42   (4) 56

2

17) In right triangle ABC shown below, AB = 18.3 and BC = 11.2.

C

11.2

A

18.3   B
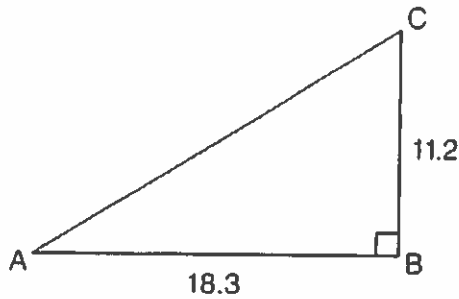
What is the measure of ∠A, to the *nearest tenth of a degree*?

(1) 31.5   (3) 52.3

(2) 37.7   (4) 58.5

1

18.) In the diagram of △ABC shown below, BC = 10 and AB = 16.

B

C   A
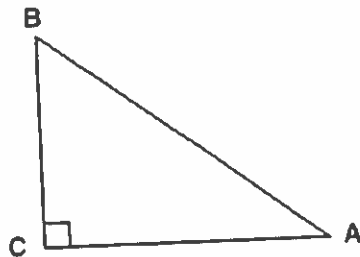
To the *nearest tenth of a degree*, what is the measure of the largest acute angle in the triangle?

(1) 32.0   (3) 51.3

(2) 38.7   (4) 90.0

3

19) A communications company is building a 30-foot antenna to carry cell phone transmissions. As shown in the diagram below, a 50-foot wire from the top of the antenna to the ground is used to stabilize the antenna.

```
        |\
        | \
        |  \  Wire
Antenna |   \ 50 ft
30 ft   |    \
        |     \
        |__    \
        |_|_____\
         Ground
```
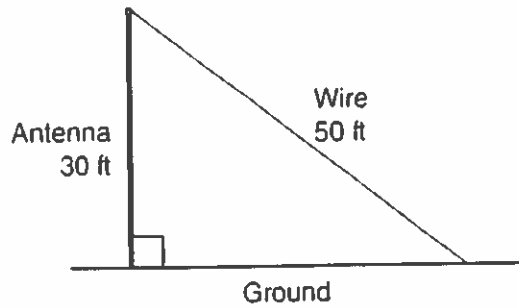
Find, to the *nearest degree*, the measure of the angle that the wire makes with the ground.

37

20.) A trapezoid is shown below.

```
        28 feet
   _____
   |               \
   |              |x\
   |              | |\ 12 feet
   |              | | \
   |_             |_|__\
   |_|_____|_|___|
        36 feet
```
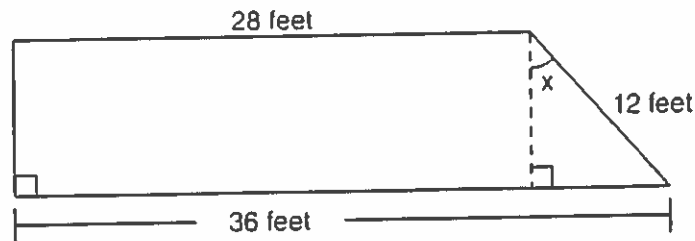
Calculate the measure of angle x, to the *nearest tenth of a degree*.

41.8

21.) In right triangle ABC, AB = 20, AC = 12, BC = 16, and m∠C = 90.
Find, to the *nearest degree*, the measure of ∠A.

53

NAME: _____

Simple Probability

A spinner that is equally divided into eight numbered sectors is spun 20 times. The table below shows the number of times the arrow landed in each numbered sector.

Spinner Sector	Number of Times
1	2
2	3
3	2
4	3
5	4
6	2
7	3
8	1

Based on the table, what is the empirical probability that the spinner will land on a prime number on the next spin?

(1) $\frac{9}{20}$ (3) $\frac{12}{20}$

(2) $\frac{11}{20}$ (4) $\frac{14}{20}$

3

A spinner is divided into eight equal regions as shown in the diagram below.
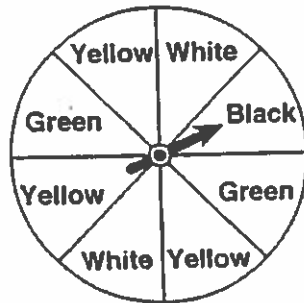
Which event is most likely to occur in one spin?

(1) The arrow will land in a green or white area.

(2) The arrow will land in a green or black area.

(3) The arrow will land in a yellow or black area.

(4) The arrow will land in a yellow or green area.

4

The spinner below is divided into eight equal regions and is spun once. What is the probability of *not* getting red?
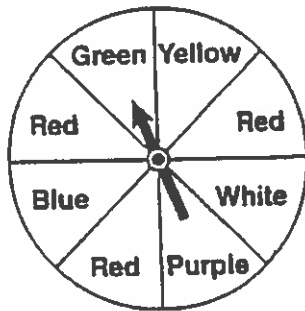
(1) $\frac{3}{5}$

(3) $\frac{5}{8}$

(2) $\frac{3}{8}$

(4) $\frac{7}{8}$

3

The spinner shown in the diagram below is divided into six equal sections.
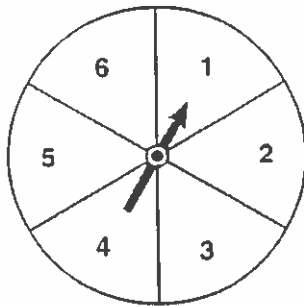
Which outcome is *least* likely to occur on a single spin?

3

(1) an odd number

(3) a perfect square

(2) a prime number

(4) a number divisible by 2

In a science fiction novel, the main character found a mysterious rock that decreased in size each day. The table below shows the part of the rock that remained at noon on successive days.

Day	Fractional Part of the Rock Remaining
1	1
2	$\frac{1}{2}$
3	$\frac{1}{4}$
4	$\frac{1}{8}$

Which fractional part of the rock will remain at noon on day 7?

2

(1) $\frac{1}{128}$

(3) $\frac{1}{14}$

(2) $\frac{1}{64}$

(4) $\frac{1}{12}$

Students in Ms. Nazzeer's mathematics class tossed a six-sided number cube whose faces are numbered 1 to 6. The results are recorded in the table below.

Result	Frequency
1	3
2	6
3	4
4	6
5	4
6	7

Based on these data, what is the empirical probability of tossing a 4?

(1) $\dfrac{8}{30}$

(3) $\dfrac{5}{30}$

(2) $\dfrac{6}{30}$

(4) $\dfrac{1}{30}$

2

Three high school juniors, Reese, Matthew, and Chris, are running for student council president. A survey is taken a week before the election asking 40 students which candidate they will vote for in the election. The results are shown in the table below.

Candidate's Name	Number of Students Supporting Candidate
Reese	15
Matthew	13
Chris	12

Based on the table, what is the probability that a student will vote for Reese?

(1) $\dfrac{1}{3}$

(3) $\dfrac{3}{8}$

(2) $\dfrac{3}{5}$

(4) $\dfrac{5}{8}$

3

A bag contains eight green marbles, five white marbles, and two red marbles. What is the probability of drawing a red marble from the bag?

(1) $\dfrac{1}{15}$

(3) $\dfrac{2}{13}$

(2) $\dfrac{2}{15}$

(4) $\dfrac{13}{15}$

2

Maria has a set of 10 index cards labeled with the digits 0 through 9. She puts them in a bag and selects one at random. The outcome that is most likely to occur is selecting

(1) an odd number

(2) a prime number

(3) a number that is at most 5

(4) a number that is divisible by 3

3

The faces of a cube are numbered from 1 to 6. If the cube is rolled once, which outcome is *least* likely to occur?

(1) rolling an odd number

(2) rolling an even number

(3) rolling a number less than 6

(4) rolling a number greater than 4

4

Casey purchased a pack of assorted flower seeds and planted them in her garden. When the first 25 flowers bloomed, 11 were white, 5 were red, 3 were blue, and the rest were yellow. Find the empirical probability that a flower that blooms will be yellow.

$6/25$

NAME: _____

AND VS. OR

1.) Keisha is playing a game using a wheel divided into eight equal sectors, as shown in the diagram below. Each time the spinner lands on orange, she will win a prize.
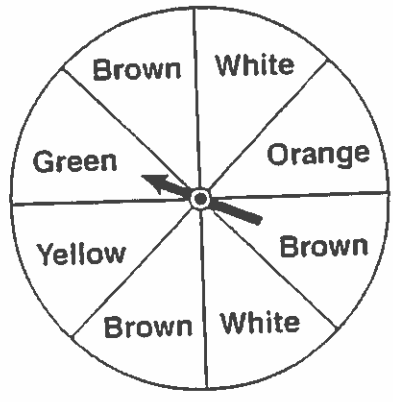
If Keisha spins this wheel twice, what is the probability she will win a prize on *both* spins?

(1) $\frac{1}{64}$ (3) $\frac{1}{16}$ |

(2) $\frac{1}{56}$ (4) $\frac{1}{4}$

2.) Brianna is using the two spinners shown below to play her new board game. She spins the arrow on each spinner once. Brianna uses the first spinner to determine how many spaces to move. She uses the second spinner to determine whether her move from the first spinner will be forward or backward.
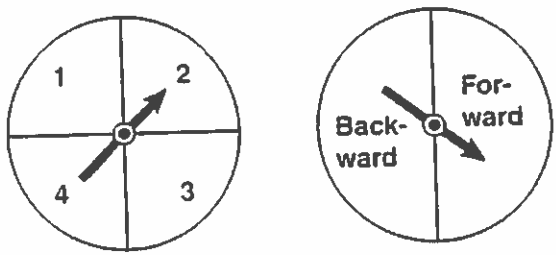
Find the probability that Brianna will move *fewer than* four spaces and *backward*.

$3/8$

3) Each of the hats shown below has colored marbles placed inside. Hat A contains five green marbles and four red marbles. Hat B contains six blue marbles and five red marbles. Hat C contains five green marbles and five blue marbles.

Hat A   Hat B   Hat C

If a student were to randomly pick one marble from each of these three hats, determine from which hat the student would most likely pick a green marble. Justify your answer.

Determine the fewest number of marbles, if any, and the color of these marbles that could be added to *each* hat so that the probability of picking a green marble will be one-half in each of the three hats.

4) Vince buys a box of candy that consists of six chocolate pieces, four fruit-flavored pieces, and two mint pieces. He selects three pieces of candy at random, without replacement.

Calculate the probability that the first piece selected will be fruit flavored and the other two will be mint.

$$\frac{8}{1320}$$

Calculate the probability that all three pieces selected will be the same type of candy.

$$\frac{144}{1320}$$

5) Three fair coins are tossed. What is the probability that two heads and one tail appear?

(1) $\frac{1}{8}$

(3) $\frac{3}{6}$

(2) $\frac{3}{8}$

(4) $\frac{2}{3}$

2

6) The probability that it will snow on Sunday is $\frac{3}{5}$. The probability that it will snow on both Sunday and Monday is $\frac{3}{10}$. What is the probability that it will snow on Monday, if it snowed on Sunday?

(1) $\frac{9}{50}$

(3) $\frac{1}{2}$

(2) 2

(4) $\frac{9}{10}$

3

7) The faces of a cube are numbered from 1 to 6. If the cube is tossed once, what is the probability that a prime number or a number divisible by 2 is obtained?

(1) $\frac{6}{6}$

(3) $\frac{4}{6}$

(2) $\frac{5}{6}$

(4) $\frac{1}{6}$

2

8) Some books are laid on a desk. Two are English, three are mathematics, one is French, and four are social studies. Theresa selects an English book and Isabelle then selects a social studies book. Both girls take their selections to the library to read. If Truman then selects a book at random, what is the probability that he selects an English book?

$\frac{1}{8}$

9) Clayton has three fair coins. Find the probability that he gets two tails and one head when he flips the three coins.

$\frac{3}{8}$

NAME: _____

Arrangements vs Choices

John is going to line up his four golf trophies on a shelf in his bedroom. How many different possible arrangements can he make?

(1) 24

(3) 10

(2) 16

(4) 4

1

How many different ways can five books be arranged on a shelf?

(1) 5

(3) 25

(2) 15

(4) 120

4

How many different four-letter arrangements are possible with the letters G, A, R, D, E, N if each letter may be used only once?

(1) 15

(3) 360

(2) 24

(4) 720

3

How many different three-letter arrangements can be formed using the letters in the word ABSOLUTE if each letter is used only once?

(1) 56

(3) 168

(2) 112

(4) 336

4

Determine how many three-letter arrangements are possible with the letters A, N, G, L, and E if no letter may be repeated.

60

How many different sandwiches consisting of one type of cheese, one condiment, and one bread choice can be prepared from five types of cheese, two condiments, and three bread choices?

(1) 10

(3) 15

(2) 13

(4) 30

4

The local ice cream stand offers three flavors of soft-serve ice cream: vanilla, chocolate, and strawberry; two types of cone: sugar and wafer; and three toppings: sprinkles, nuts, and cookie crumbs. If Dawn does not order vanilla ice cream, how many different choices can she make that have one flavor of ice cream, one type of cone, and one topping?

(1) 7

(3) 12

(2) 8

(4) 18

3

A password consists of three digits, 0 through 9, followed by three letters from an alphabet having 26 letters.

If repetition of digits is allowed, but repetition of letters is not allowed, determine the number of different passwords that can be made.

3,600,000

If repetition is not allowed for digits or letters, determine how many fewer different passwords can be made.

4,368,000

NAME: _____

Tree Diagrams and Sample Spaces

1.) An outfit Jennifer wears to school consists of a top, a bottom, and shoes. Possible choices are listed below.

Tops: T-shirt, blouse, sweater

Bottoms: jeans, skirt, capris

Shoes: flip-flops, sneakers

List the sample space or draw a tree diagram to represent all possible outfits consisting of one type of top, one type of bottom, and one pair of shoes.

Determine how many different outfits contain jeans and flip-flops.

3

Determine how many different outfits do *not* include a sweater.

12

2) A sandwich consists of one type of bread, one type of meat, and one type of cheese. The possible choices are listed below.

Bread: white, rye

Meat: ham, turkey, beef

Cheese: American, Swiss

Draw a tree diagram or list a sample space of all the possible different sandwiches consisting of one type of bread, one type of meat, and one type of cheese.

Determine the number of sandwiches that will *not* include turkey.

8

Determine the number of sandwiches that will include rye bread and Swiss cheese.

3

5) A restaurant sells kids' meals consisting of one main course, one side dish, and one drink, as shown in the table below.

Kids' Meal Choices

Main Course	Side Dish	Drink
hamburger	French fries	milk
chicken nuggets	applesauce	juice
turkey sandwich		soda

Draw a tree diagram or list the sample space showing all possible kids' meals. How many different kids' meals can a person order?

18

José does not drink juice. Determine the number of different kids' meals that do *not* include juice.

12

José's sister will eat *only* chicken nuggets for her main course. Determine the number of different kids' meals that include chicken nuggets.

6