

Simplify

$$1. \frac{6x-48}{2x-16} = \frac{6(x-8)}{2(x-8)} = \frac{6}{2} \cdot \frac{\cancel{(x-8)}}{\cancel{(x-8)}} = 3$$

$$2. \frac{3a^2+2a-1}{a^2-1} = \frac{(3a-1)(a+1)}{(a-1)(a+1)} = \frac{3a-1}{a-1}$$

$$3. \frac{4+x}{x^2+5x+4} = \frac{(x+4)}{(x+4)(x+1)} = \frac{1}{x+1}$$

Add or subtract.

$$4. \frac{3}{2a} + \frac{5}{2a} = \frac{8}{2a} = \frac{4}{a}$$

$$5. \frac{6}{b-1} - \frac{7}{b-1} = \frac{-1}{b-1}$$

$$6. \frac{10}{a} + \frac{12}{a^2} = \frac{10a}{a^2} + \frac{12}{a^2} = \frac{10a+12}{a^2}$$

Simplify.

$$7. (7t^2+9) + (6t^2+8) = 13t^2+17$$

$$8. 5x^3y^2 - 7x^3y^2 = -2x^3y^2$$

$$9. (3m^2+2m-8) + (4m^2-5m+6) = 7m^2-3m-2$$

Simplify each product.

$$10. 3n(4n^2+5n) = 12n^3+15n^2$$

$$11. 4k^2(3-4k) = 12k^2-16k^3$$

$$12. -7y^3(4y^2+y-3) = -28y^5-7y^4+21y^3$$

Factor each polynomial.

$$13. 18s-63 = 9(2s-7)$$

$$14. 30b^2+48b-24 = 6(5b^2+8b-4) = 6[(5b^2+10b)(-2b-4)] = 6(b+2)(5b-2)$$

$$15. w^5+4w^4+10w^3+40w^2 = w^2(w^3+4w^2+10w+40)$$

Simplify each product.

$$16. (x+7)(x+5) = \begin{array}{|c|c|} \hline x & 7 \\ \hline x^2 & 7x \\ \hline 5x & 35 \\ \hline \end{array} = x^2+12x+35$$

$$17. (j+3)(j-4) = \begin{array}{|c|c|} \hline j & 3 \\ \hline j^2 & 3j \\ \hline -4j & -12 \\ \hline \end{array} = j^2-j-12$$

$$18. (3x-1)(x-6) = \begin{array}{|c|c|} \hline 3x & -1 \\ \hline 3x^2 & -1x \\ \hline -18x & +6 \\ \hline \end{array} = 3x^2-19x+6$$

$$19. (d+4)(d+4) \text{ Special}$$

$$d^2+8d+16$$

$$20. (3a+7)(3a-7) \text{ difference of per squares}$$

$$9a^2-49$$

$$21. (2z-3)^2 \text{ Special}$$

$$4z^2-12z+9$$

22. A rectangle has length $x + 9$ and width $2x - 1$. What is the area of the rectangle?

$A_{\square} = L \times W$

$x + 9$	
$2x^2$	$18x$
$-1x$	-9

$2x$

$A = 2x^2 + 17x - 9$

23. A square has side length $(5x - 3)$ cm. What is the area of the square?

$A_{sq} = L \times W$

$5x - 3$	
$25x^2$	$-15x$
$-15x$	9

$5x$

$25x^2 - 30x + 9$

Factor each expression completely.

24. $x^2 + 11x + 24$

$(x + 8)(x + 3)$

25. $s^2 - 7s + 12$

$(s - 4)(s - 3)$

26. $2m^2 + 27m + 70$

$\begin{matrix} 140 \\ 14 \\ 26 \end{matrix}$

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$(m + 10)(2m + 7)$

27. $4z^2 - 16z + 15$

$\begin{matrix} 60 \\ 10 \end{matrix}$

$\begin{matrix} 60 \\ 10 \end{matrix}$

$(2z - 5)(2z - 3)$

28. $8y^2 - 22y - 21$

$\begin{matrix} 168 \\ 28 \end{matrix}$

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$(2y - 7)(4y + 3)$

29. $9x^2 + 48x + 64$

$\begin{matrix} 576 \\ 24 \end{matrix}$

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$(3x + 8)(3x + 8)$

30. $g^2 - 64$

diff of perfect squares

$(g + 8)(g - 8)$

31. $4s^2 - 25$

diff of perfect squares

$(2s - 5)(2s + 5)$

32. $49t^2 - 9$

diff of perfect squares

$(7t + 3)(7t - 3)$

33. The area of a rectangular field is given by the trinomial $t^2 - 4t - 45$. The length of the rectangle is $t + 5$. What is the expression for the width of the field?

$W = \frac{A}{L}$

$W = \frac{t^2 - 4t - 45}{t + 5}$

$W = \frac{(t + 5)(t - 9)}{(t + 5)}$

$W = t - 9$

34. The area of a rectangle is given by the trinomial $10x^2 - 31x - 14$. The length of the rectangle is $5x + 2$. What is the expression for the width of the rectangle?

$W = \frac{A}{L}$

$W = \frac{10x^2 - 31x - 14}{5x + 2}$

$W = \frac{(2x - 7)(5x + 2)}{5x + 2}$

$W = 2x - 7$

35. The area of a square room is $16x^2 + 72x + 81$. What is the length of one side of the room?

Area = $L \times W$

Special case $\sqrt{16} = 4$ $\sqrt{81} = 9$ $4 \times 9 = 36$ - double it for middle term

$(4x + 9)(4x + 9)$

length = $4x + 9$

72