

Factor

$$\begin{array}{cc} 4 & 2 \\ 22 & 21 \end{array}$$

$$a) \quad 2x + 2 = 2(x + 1) = 2x + 2$$

Diagram showing the factoring process for $2x + 2$. The term $2x$ is broken down into 2 and x , and the constant 2 is broken down into 2 and 1 . A blue arc connects the 2 from $2x$ and the 2 from the constant term, indicating the common factor. The final result is $2(x + 1)$, with a checkmark above it.

$$b) \quad x^2 + 4x = x(x + 4)$$

Diagram showing the factoring process for $x^2 + 4x$. The term x^2 is broken down into x and x , and the term $4x$ is broken down into 4 and x . The common factor x is identified, leading to the factored form $x(x + 4)$.

$$c) \quad 4x^3 - 6x^2y = 2x^2(2x - 3y)$$

Diagram showing the factoring process for $4x^3 - 6x^2y$. The term $4x^3$ is broken down into 2 , 2 , x , x , and x . The term $6x^2y$ is broken down into 2 , 3 , x , x , and y . The common factor $2x^2$ is identified, leading to the factored form $2x^2(2x - 3y)$.

a) $9x^3 + 30x = 3x(3x^2 + 10)$

$9x^3$ is factored as $3 \cdot 3 \cdot x \cdot x \cdot x$
 $30x$ is factored as $2 \cdot 3 \cdot 5 \cdot x$

b) $6x^2 + 10x - 2 = 2(3x^2 + 5x - 1)$

$6x^2$ is factored as $2 \cdot 3 \cdot x \cdot x$
 $10x$ is factored as $2 \cdot 5 \cdot x$
 -2 is factored as $-1 \cdot 2$

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$$12x^3y - 9x^2y^2 + 6xy^3$$

$$\cancel{3} \cdot 4 \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{y} \quad \cancel{3} \cdot 3 \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{y} \cdot \cancel{y} \quad \cancel{3} \cdot 2 \cdot \cancel{x} \cdot \cancel{y} \cdot \cancel{y} \cdot \cancel{y}$$

$$3xy(4x^2 - 3xy + 2y^2)$$

Factoring by Grouping

1. 4 terms

2. 1st 2 terms last 2 terms

$$4x^2 + 20x + 3x + 15$$

2. 2. x. x 2. 2. 5. x 3. x 3. 5

$$\begin{array}{c} 4x^2 + 20x + 3x + 15 \\ \begin{array}{c} \wedge \\ 2 \cdot 2 \cdot x \cdot x \\ \wedge \\ 2 \cdot 2 \cdot 5 \cdot x \end{array} \quad \begin{array}{c} \wedge \\ 3 \cdot x \\ \wedge \\ 3 \cdot 5 \end{array} \end{array}$$
$$4x(x+5) + 3(x+5)$$
$$(x+5)(4x+3)$$

$$\textcircled{4} \quad x^3 + 12x^2 - 3x - 36$$

$$\begin{array}{cc}
 x^3 + 12x^2 & -3x - 36 \\
 \color{green}{x \cdot x \cdot x} & \color{green}{12 \cdot x \cdot x} \quad \color{blue}{-1 \cdot 3 \cdot x} \quad \color{blue}{-1 \cdot 2 \cdot 2 \cdot 3}
 \end{array}$$

$$x^2(x + 12) - 3(x + 12)$$

$$(x^2 - 3)(x + 12)$$

Daily check : Factor

1) $7x^2 - 49x$

2) $3x^3y - 2xy^2 + 4x^2y^2$

$$\textcircled{7} \quad p^3 + 9p^2 \quad \div \quad 4p \quad \div \quad 36$$

$p \cdot p \cdot p$ $3 \cdot 3 \cdot p \cdot p$ $2 \cdot 2 \cdot p$ $2 \cdot 2 \cdot 3 \cdot 3$

$$p^2(p+9) \quad \div \quad 4(p+9)$$

$$(p+9)(p^2 \div 4)$$