Factorizing Equations

Step-by-step method

Step 1 — Find the common factor

Look for the largest number or variable that divides into every term.

Example:

$$8x + 12$$

Both terms can be divided by 4.

Step 2 — Divide each term by the common factor

$$8x \div 4 = 2x$$

$$12 \div 4 = 3$$

Step 3 — Write the factor outside brackets

$$8x + 12 = 4(2x + 3)$$

Example with variable factors

Factorise:

$$12x^2 + 6x$$

Both terms share:

- 6
- x

So the HCF is $6x$.

Divide each term:

$$12x^2 \div 6x = 2x$$

$$6x \div 6x = 1$$

Answer:

$$12x^2 + 6x = 6x(2x + 1)$$

a. $10a + 5b + 15$

b. $3c + 6 - 9d$

c. $8x + 10y - 12z$

d. $x^2 + 2x$

e. $14x^2 - 35x$

f. $16b^2 + 24b$

g. $2ab + 4b^2$

h. $33xy + 44x^2$

i. $20ab - 8b^2$

j. $9ef + 3e^2f$

k. $4x^2y + 8x - 10xy$

l. $18a^3 - 27a + 9a^2$

m. $12p^2q + 14pq^2$

n. $\frac{4a^2b}{4a^2b} + \frac{8a^2b^2}{4a^2b}$ $4a^2b($)

o. $\frac{9x^3y^2}{3x^2y^2} - \frac{12x^2y^3}{3x^2y^2}$ $3x^2y^2($)

a. $30x^2 - 45xy + 60x$

b. $\frac{15a^3b^2}{5a^2b^2} + \frac{25a^2b^3}{5a^2b^2}$ $5a^2b^2($)

c. $12p^2qr + 9p^2q^2r - 15pqr^2$

d. $14a^2b^2+7ab^2+49a^2b$

e. $18c^2d^2e + 27cd^2e^2 - 9cde$

f. $4g^4\,h^2\,i - 16gh^3\,i^4 - 40g^2\,h^3\,i^5$

g. $x^2 - 9$

h. $x^2 - 49$

i. $x^2 - 81$

j. $4(x + 2) - 8(x + 2)^2$

k. $15(2a - 1)^3 + 25(2a - 1)^2$

l. The area of a rectangle is $(8x2 - 10x)cm^2$. What could length and width be?

m. The area of a rectangle is $(9x^2 - 10xy)cm^2$. What could length and width be?

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