Grade 8 Factorization

Q1) Factorize by grouping the terms

i) $15xy - 6x + 10y - 4$ ii) $n - 7 + 7lm - lmn$ iii) x^2- x z + x y- x z

Q2) Factorize using identity

i) $9a^2 - 16b^2$ ii) $80a^2 - 45b^2$ iii) $x^4 - y^4$

Q3) Factorize as perfect square using identity.

i) $x^2 + 8x + 16$ ii) $4x^2 - 4xy + y^2 - 9z^2$

iii) $4(x + y)^2 - 28y(x + y) + 49y^2$

Q4) Factorize by splitting the middle term.

i) $x^2 - 11x - 42$ ii) $6x^2 + 5x - 6$ iii) $x^2 + 5x - 36$

Q5) Factorize by method of completing square.

i) $z^2 - 4z - 12$

Q6) $x + \frac{1}{x} = 4\ find\ the\ value\ of$

$i) x^2 + \frac{1}{x^2}$ $ii) x^4 + \frac{1}{x^4}$

Q7) If $\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = \frac{10}{3}\ find\ xy\ and\ (x + y)$

Answer key

A1) i)(3x+2)(5y-2) ii)(n-7)(1-lm) iii) $x(x-2z+y)$

A2) i) (3a-4b)(3a+4b)

ii) $80a^2-45b^2=5(16a^2-9b^2)$

$=5\{(4a)^2-(3b)^2\}$

$=5(4a+3b)(4a-3b)$

iii) $x^4-y^4=(x^2)^2-(y^2)^2$

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

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

A3) i) $(x+4)^2$

ii) ii) $4x^2-4xy+y^2-9z^2$

$=\ (2x)^2-2\times 2x\times y+y^2-9z^2$

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

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

iii) $4(x+y)^2-28y(x+y)+49y^2$

$\{2(x+y)\}^2-2\times 2(x+y)\times 7y+(7y)^2$

$=\{2(x+y)-7y\}^2$

$= (2x + 2y - 7y)^2$

$(2x - 7y)^2$

A4)

i) $x^2 - 11x - 42$

$x^2 - 14x + 3x - 42$

$x(x + 3) - 14(x + 3)$

$= (x + 3)(x - 14)$

ii)

ii) $6x^2 + 5x - 6$

$6x^2 + 9x - 4x - 6$

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

iii) $x^2 + 5x - 36$

$x^2 + 9x - 4x - 36$

$= x(x + 9) - 4(x + 9)$

$= (x - 4)(x + 9)$

A5)i) (z-6)(z+2) hint (z^2-2*2*z+2^2)-2^2-12=$(z-2)^2$-4^2

$\Rightarrow (z - 2 - 4)(z - 2 + 4) \Rightarrow (z - 6)(z + 2)$

Sol6)

$(x+\frac{1}{x})^2 = x^2 + 2x \times \frac{1}{x} + \frac{1}{x^2}$

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

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

$14 = x^2 + \frac{1}{x^2}$

ii)

Now,

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

$x^2 + \frac{1}{x^2} = 14$

$(14)^2 = x^4 + 2 + \frac{1}{x^4}$

$x^4 + \frac{1}{x^4} = 196 - 2 = 194$

Q7) If $\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = \frac{10}{3}$ $find\ xy\ and\ (x+y)$

Sol7) $\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = \frac{10}{3}$

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

Cross multiply

$\Rightarrow \frac{\sqrt{x} \times \sqrt{x} + \sqrt{y} \times \sqrt{y}}{\sqrt{x}\sqrt{y}}$

$\Rightarrow \frac{(\sqrt{x})^2 + (\sqrt{y})^2}{\sqrt{x}\sqrt{y}}$

$\Rightarrow \frac{x+y}{\sqrt{xy}} = \frac{10}{3}$

$\Rightarrow x + y = 10 \ \ and \ xy = 3^2 = 9$