



Grade 9

Mathematics

Factorising – common factors

Question 1: Factorise the following expressions

1. $12f + 60f^2$
2. $2p + pq - p^2$
3. $36x^3y^4 - 48x^4y^2$
4. $9ab - 27abc - 45a$
5. $24gh - 12g + 15h$

$$\begin{aligned} \textcircled{1} \quad 12f + 60f^2 &= 12f(1 + 5f) \\ \textcircled{2} \quad 2p + pq - p^2 &= p(2 + q - p) \\ \textcircled{3} \quad 36x^3y^4 - 48x^4y^2 &= 12x^3y^2(3y^2 - 4x) \\ \textcircled{4} \quad 9ab - 27abc - 45a &= 9a(b - 3ac - 5) \\ \textcircled{5} \quad 24gh - 12g + 15h &= 3(8gh - 4g + 5h) \end{aligned}$$

Question 2: Factorise the following expressions – you may need to

1. $xy - 6y - 2x + 12$
2. $9y^2 - 45xy + 8y - 40x$
3. $x^2 - ax - bx + ab$
4. $ab^2 - bc^2 - ab + c^2$
5. $x^2 - xz + xy - yz$
6. $-7p^2q - 49pq$
7. $5a - 25b + 10b - 2a$
8. $3m + 6n - 7n - 14n$

$$\begin{aligned} \textcircled{1} \quad xy - 6y - 2x + 12 &= y(x - 6) - 2(x - 6) \\ &= (x - 6)(y - 2) \\ \textcircled{2} \quad 9y^2 - 45xy + 8y - 40x &= 9y(y - 5x) + 8(y - 5x) \\ &= (y - 5x)(9y + 8) \\ \textcircled{3} \quad x^2 - ax - bx + ab &= x(x - a) - b(x - a) \\ &= (x - a)(x - b) \\ \textcircled{4} \quad ab^2 - bc^2 - ab + c^2 &= b(ab - c^2) - (ab - c^2) \\ &= (ab - c^2)(b - 1) \end{aligned}$$

$$\begin{aligned} \textcircled{5} \quad x^2 - xz + xy - yz &= x(x - z) + y(x - z) \\ &= (x - z)(x + y) \\ \textcircled{6} \quad -7p^2q - 49pq &= -7pq(p + 7) \end{aligned}$$

$$\begin{aligned} \textcircled{7} \quad 5a - 25b + 10b - 2a &= 5(a - 5b) - 2(a - 5b) \\ &= (a - 5b)(5 - 2) \\ &= 3(a - 5b) \\ \textcircled{8} \quad 3m + 6n - 7n - 14n &= 3(m + 2n) - 7(m + 2n) \\ &= (m + 2n)(3 - 7) \\ &= -4(m + 2n) \end{aligned}$$