Grade 10 Math Course

Mastering Mathematics for a Brighter Future

Mathematics: Expansion, Factorisation, and Difference of Two Squares

Review of Expansion and Factorisation

Recall: Expansion of algebraic expression has to do with removing brackets and simplifying.

While factorisation of an algebraic expression means expressing it as a product of factors.

Examples: Expansion

1. $(r - x)(r + y) = r(r + y) - x(r + y) = r^2 + ry - xr - xy$

2. $(x - 5)(x + 8) = x(x + 8) - 5(x + 8)$
   $= x^2 + 8x - 5x - 40 = x^2 + 3x - 40$

3. $(m + 4n)^2 = (m + 4n)(m + 4n)$
   $= m(m + 4n) + 4n(m + 4n)$
   $= m^2 + 4mn + 4mn + 16n^2 = m^2 + 8mn + 16n^2$

Examples: Factorisation

4. Factorise $8p - 20q$
   $= 4(8p/4 - 20q/4)$
   $= 4(2p - 5q)$

5. Factorise $12x^2 + 3x - 4x - 1$
   $(12x^2 + 3x) - (4x + 1)$
   $= 3x(4x + 1) - 1(4x + 1)$
   $= (3x - 1)(4x + 1)$

6. Factorise 3x - 2dy + 3y - 2dx
   Group terms: (3x + 3y) - (2dy + 2dx)
   = 3(x + y) - 2d(y + x)
   = (3 - 2d)(x + y)

Difference of Two Squares

$(a - b)(a + b) = a^2 + ab - ab - b^2 = a^2 - b^2$
Hence, $a^2 - b^2 = (a + b)(a - b)$

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Examples: Difference of Two Squares

1. $y^2 - 4 = (y)^2 - (2)^2$
   $= (y - 2)(y + 2)$

2. $36 - 9a^2 = 6^2 - (3a)^2$
   $= (6 - 3a)(6 + 3a)$

3. Factorise: $5a^2 - 45 = 5(a^2 - 9)$
   $= 5[(a - 3)(a + 3)]$