



National 5 Mathematics

Algebraic Operations – Solutions

Marks are indicated in brackets after each question number

2014 Paper 1 Question 2, (2)

$$\begin{aligned}(2x - 5)(3x + 1) &= 6x^2 - 15x + 2x - 5 \\ &= 6x^2 - 13x - 5\end{aligned}$$

2015 Paper 1 Question 4, (3)

$$\begin{aligned}(x - 4)(x^2 + x - 2) \\ &= x^3 + x^2 - 2x - 4x^2 - 4x + 8 \\ &= x^3 - 3x^2 - 6x + 8\end{aligned}$$

2016 Paper 2 Question 4, (2)

$$\begin{aligned}3x^2 - 48 \\ &= 3(x^2 - 16) \\ &= 3(x - 4)(x + 4)\end{aligned}$$

2017 Paper 1 Question 4, (3)

$$\begin{aligned}(2x + 3)(x^2 - 4x + 1) \\ &= 2x^3 - 8x^2 + 2x + 3x^2 - 12x + 3 \\ &= 2x^3 - 5x^2 - 10x + 3\end{aligned}$$

2017 Paper 1 Question 8, (1) (3)

$$\begin{aligned}\text{a) } 4x^2 - 25 &= (2x)^2 - 5^2 \\ &= (2x - 5)(2x + 5)\end{aligned}$$

$$\begin{aligned}\text{b) } \frac{4x^2 - 25}{2x^2 - x - 10} &= \frac{(2x - 5)(2x + 5)}{(2x - 5)(x + 2)} \\ &= \frac{2x + 5}{x + 2}\end{aligned}$$

**2018 Paper 1 Question 2, (3)**

$$\begin{aligned}(3x + 1)(x - 1) + 2(x^2 - 5) \\ = 3x^2 + x - 3x - 1 + 2x^2 - 10 \\ = 5x^2 - 2x - 11\end{aligned}$$

2019 Paper 1 Question 3, (3)

$$\begin{aligned}(x + 5)(2x^2 - 7x - 3) \\ = 2x^3 - 7x^2 - 3x + 10x^2 - 35x - 15 \\ = 2x^3 + 3x^2 - 38x - 15\end{aligned}$$

2022 Paper 2 Question 1, (3)

$$\begin{aligned}(3x - 2)(2x^2 + 5x - 1) \\ = 6x^3 + 15x^2 - 3x - 4x^2 - 10x + 2 \\ = 6x^3 + 11x^2 - 13x + 2\end{aligned}$$

2023 Paper 1 Question 2, (3)

$$\begin{aligned}(x + 7)^2 + 6(x^2 - 10) \\ = (x + 7)(x + 7) + 6(x^2 - 10) \\ = x^2 + 7x + 7x + 49 + 6x^2 - 60 \\ = 7x^2 + 14x - 11\end{aligned}$$

2024 Paper 1 Question 3, (3)

$$\begin{aligned}(x + 1)(x^2 - 4x + 5) \\ = x^3 - 4x^2 + 5x + x^2 - 4x + 5 \\ = x^3 - 3x^2 + x + 5\end{aligned}$$

2025 Paper 1 Question 2, (2)

$$\begin{aligned}(x + 3)(x + 5) + 4(x - 2) \\ = x^2 + 3x + 5x + 15 + 4x - 8 \\ = x^2 + 12x + 7\end{aligned}$$



2025 Paper 2 Question 5, (2)

$$\begin{aligned}x^2 + 10x + 19 &= (x + 5)^2 - 25 + 19 \\ &= (x + 5)^2 - 6\end{aligned}$$