

1 (a) Expand and simplify $(x + 4)(x - 2)(x + 1)$

Expand first 2 terms :

$$\begin{aligned}(x+4)(x-2) &= x^2 - 2x + 4x - 8 \\ &= x^2 + 2x - 8 \quad (1)\end{aligned}$$

Multiply with the remaining term :

$$\begin{aligned}(x^2 + 2x - 8)(x + 1) &= x^3 + x^2 + 2x^2 + 2x - 8x - 8 \quad (1) \\ &= x^3 + 3x^2 - 6x - 8 \quad (1)\end{aligned}$$

$$x^3 + 3x^2 - 6x - 8$$

(3)

(Total for Question 1 is 3 marks)

2 (a) Expand and simplify $(3x - 1)(x + 2)(3x + 1)$

Expand first 2 terms :

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

Expand remaining term :

$$\begin{aligned}(3x^2 + 5x - 2)(3x + 1) &= 9x^3 + 3x^2 + 15x^2 + 5x - 6x - 2 \quad (1) \\ &= 9x^3 + 18x^2 - x - 2 \quad (1)\end{aligned}$$

$$\begin{array}{r} 9x^3 + 18x^2 - x - 2 \\ \hline (3) \end{array}$$

(Total for Question 2 is 3 marks)

- 3 (a) Expand and simplify $(5 - x)(2x + 3)(x + 4)$
Show your working clearly.

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

$$\begin{aligned}(-2x^2 + 7x + 15)(x + 4) &= -2x^3 - 8x^2 + 7x^2 + 28x + 15x + 60 \\ &= -2x^3 - x^2 + 43x + 60\end{aligned}$$

$$\begin{array}{r} \textcircled{3} \quad -2x^3 - x^2 + 43x + 60 \\ \hline (3) \end{array}$$

4 (a) Expand and simplify $n(n-4)(3n+5)$

$$\begin{aligned}(n-4)(3n+5) &= 3n^2 + 5n - 12n - 20 \\ &= 3n^2 - 7n - 20 \quad (1)\end{aligned}$$

$$\begin{aligned}n(3n^2 - 7n - 20) \\ = 3n^3 - 7n^2 - 20n \quad (1)\end{aligned}$$

$$\begin{aligned}3n^3 - 7n^2 - 20n \\ \hline (2)\end{aligned}$$

(Total for Question 4 is 2 marks)

5 (a) Expand and simplify $5x(x+2)(3x-4)$

$$\begin{aligned}(x+2)(3x-4) &= 3x^2 - 4x + 6x - 8 \\ &= 3x^2 + 2x - 8 \quad (1)\end{aligned}$$

$$5x(3x^2 + 2x - 8) \quad (1)$$

$$15x^3 + 10x^2 - 40x \quad (1)$$

$$15x^3 + 10x^2 - 40x$$

(3)

(Total for Question 5 is 3 marks)

6 (c) Expand and simplify $5x(3x + 4)(2x - 1)$

$$\begin{aligned}(3x+4)(2x-1) &= 6x^2 - 3x + 8x - 4 \\ &= 6x^2 + 5x - 4 \quad (1)\end{aligned}$$

$$\begin{aligned}5x(6x^2 + 5x - 4) &\quad (1) \\ = 30x^3 + 25x^2 - 20x &\quad (1)\end{aligned}$$

$$30x^3 + 25x^2 - 20x$$

(3)

(Total for Question 6 is 3 marks)

- 7 Expand and simplify $3x(2x - 5)^2$
Show clear algebraic working.

$$(2x-5)^2 = 4x^2 - 20x + 25 \quad (1)$$

$$3x(4x^2 - 20x + 25) \quad (1)$$

$$= 12x^3 - 60x^2 + 75x \quad (1)$$

$$12x^3 - 60x^2 + 75x$$

(Total for Question 7 is 3 marks)

8 (a) Expand and simplify $(x + 6)(3x - 2)(x + 6)$

$$\begin{aligned}(x+6)(3x-2) &= 3x^2 - 2x + 18x - 12 \\ &= 3x^2 + 16x - 12 \quad (1)\end{aligned}$$

$$\begin{aligned}(3x^2 + 16x - 12)(x+6) &= 3x^3 + 18x^2 + 16x^2 + 96x - 12x - 72 \quad (1) \\ &= 3x^3 + 34x^2 + 84x - 72 \\ &\quad (1)\end{aligned}$$

$$3x^3 + 34x^2 + 84x - 72$$

(3)

(Total for Question 8 is 3 marks)