

EXPAND AND SIMPLIFY

T&amp;T6 Page 1

$$\begin{aligned} \textcircled{1} \quad & 7(x^3 + 2x^2 - 5x) - 2(2 + 3x + 4x^2 - 2x^3) \\ & 7x^3 + 14x^2 - 35x - 4 - 6x - 8x^2 + 4x^3 \\ & 11x^3 + 6x^2 - 41x - 4 \end{aligned}$$

$$\begin{aligned} \textcircled{2} \quad & 3x^2(4x^2 - 5x + 6) + 4x(8x^3 - 2x - 3) \\ & 12x^4 - 15x^3 + 18x^2 + 32x^4 - 8x^2 - 12x \\ & 44x^4 - 15x^3 + 10x^2 - 12x \end{aligned}$$

eg. 2

$$\begin{aligned} & (x-5)(2x^2 - 3x + 6) \\ & = x(2x^2 - 3x + 6) - 5(2x^2 - 3x + 6) \\ & = 2x^3 - 3x^2 + 6x - 10x^2 + 15x - 30 \\ & = 2x^3 - 13x^2 + 21x - 30 \end{aligned}$$

eg 3

Given  $25x^2 + px + 16$  is a perfect squareand  $p > 0$ . Find  $p$ ?

$$25x^2 + px + 16$$

$$\begin{array}{c} \text{20x} \\ \overbrace{(5x+4)(5x+4)} \\ \text{20x} \end{array}$$

$$\begin{array}{r} +16 \\ 4 \times 4 \\ -4x - 4 \end{array}$$

$$px = 40x$$

$$p = 40$$

You should learn these expansions

$$(a+b)^2 = a^2 + 2ab + b^2$$

Examples

$$(2x+3)^2 = 4x^2 + 12x + 9$$

$$(x^2-x)^2 = x^4 - 2x^3 + x^2$$

$$(a-b)(a+b) = a^2 - b^2$$

eg 4

Divide  $2x^3 - 11x + 6$  by  $x - 2$ 

$$x-2 \overline{) 2x^3 + 0x^2 - 11x + 6}$$

Homework Page 5 T&amp;T6

Q.8 (i)  $(x+2)^2 = x^2 + x + \frac{1}{4}$

(ii)  $8(x - 1/4)^2 = 8(x^2 - \frac{1}{2}x + \frac{1}{16}) = 8x^2 - 4x + \frac{1}{2}$

(iii)  $-(1 - x)^2 = -(1 - 2x + x^2) = -1 + 2x - x^2$

Q.12 If  $9x^2 + 24x + s$  is a perfect square for all values of  $x$  find  $s$ ?

$$9x^2 + 24x + s$$

$$(3x + p)(3x + p)$$

$\uparrow$   
 $12x$   
 $\downarrow$   
 $12x$   
 $?$

$$3 \times p = 12x$$

$$3p = 12$$

$$p = 4$$

$$p^2 = s = 16$$

USEFUL TO KNOW

$$\begin{aligned}
 * (a+b)^2 &= (a+b)(a+b) \\
 &= a(a+b) + b(a+b) \\
 &= a^2 + ab + ab + b^2 \\
 &= a^2 + 2ab + b^2
 \end{aligned}$$

Q.24 Divide

DMSA

(i)  $x^3 - 8x^2 + 19x - 12$  by  $(x - 1)$ 

$$\begin{array}{r}
 \phantom{x-1} \overline{x^2 - 7x + 12} \\
 x-1 \overline{) x^3 - 8x^2 + 19x - 12} \\
 \underline{+ x^3 \phantom{- 8x^2} + x^2} \phantom{+ 19x - 12} \\
 \phantom{x-1} \overline{-7x^2 + 19x} \\
 \phantom{x-1} \underline{+ 7x^2 - 7x} \phantom{- 12} \\
 \phantom{x-1} \phantom{+ 19x} \overline{12x - 12} \\
 \phantom{x-1} \phantom{+ 19x} \underline{+ 12x - 12} \\
 \phantom{x-1} \phantom{+ 19x} \phantom{+ 12x} \overline{0}
 \end{array}$$