

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

$$\begin{array}{r|rrrr} -2 & 4 & -3 & 0 & 5 \\ & & -8 & 22 & -44 \\ \hline & 4 & -11 & 22 & -39 \end{array}$$

$$P(-2) = -39$$

2.

$$\begin{array}{r|rrrr} 3 & 4 & -3 & 0 & 5 \\ & & 12 & 27 & 81 \\ \hline & 4 & 9 & 27 & 86 \end{array}$$

$$P(3) = 86$$

$$3. P(-\frac{1}{2})$$

$$\begin{array}{r|rrrr} -\frac{1}{2} & 4 & -3 & 0 & 5 \\ & & -2 & \frac{3}{2} & -\frac{5}{4} \\ \hline & 4 & -5 & \frac{3}{2} & \frac{15}{4} \end{array}$$

$$P(-\frac{1}{2}) = \frac{15}{4}$$

4. $(x-1)$

$$\begin{array}{r|rrrrrr} 1 & 1 & 0 & -3 & 1 & 0 & -3 \\ & & 1 & 1 & -2 & -1 & -1 \\ \hline & 1 & 1 & -2 & -1 & -1 & -4 \end{array}$$

Remainder = -4

5. $(x+1)$

$$\begin{array}{r|rrrrrr} -1 & 1 & 0 & -3 & 1 & 0 & -3 \\ & & -1 & 1 & 2 & -3 & 3 \\ \hline & 1 & -1 & -2 & 3 & -3 & 0 \end{array}$$

Remainder = 0

6. $(x-2)$

$$\begin{array}{r|rrrrrr} 2 & 1 & 0 & -3 & 1 & 0 & -3 \\ & & 2 & 4 & 2 & 6 & 12 \\ \hline & 1 & 2 & 1 & 3 & 6 & 9 \end{array}$$

Remainder = 9

7. $x^4 - 10x^3 + 35x^2 - 50x + 24$

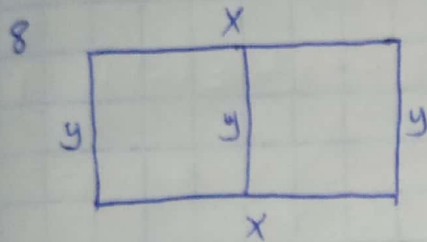
$(x-1), (x-3)$

$$\begin{array}{r|rrrrr} 1 & 1 & -10 & 35 & -50 & 24 \\ & & 1 & -9 & 26 & -24 \\ \hline & 1 & -9 & 26 & -24 & 0 \end{array}$$

$$3 \left| \begin{array}{rrrr} 1 & -9 & 26 & -24 \\ & 3 & -18 & 24 \\ \hline 1 & -6 & 8 & 0 \end{array} \right.$$

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

$$= (x-2)(x-4)$$



$$2x + 3y = 900$$

$$A = xy$$

$$2x = 900 - 3y$$

$$x = \frac{900 - 3y}{2}$$

$$A = \left(\frac{900 - 3y}{2} \right) y$$

$$A = 450y - \frac{3}{2}y^2$$

$$A' = 450 - 3y$$

$$450 - 3y = 0$$

$$450 = 3y$$

$$y = 150$$

$$x = \frac{900 - 3(150)}{2} = 225$$

$$A = (225)(150) = 33750 \text{ ft}^2$$

9.

Number of passengers = $(2000 - 200x)$ £
 Rate = $(20 + 5x)$

$$P(x) = (2000 - 200x)(20 + 5x)$$

$$P(x) = 40000 + 6000x - 1000x^2$$

$$P'(x) = 6000 - 2000x$$

$$6000 - 2000x = 0$$

$$2000x = 6000$$

$$x = 3$$

$$3 \times 5 = 15 \text{ cents}$$

$$\text{Rate} = 15 \text{ cents}$$

10. $4, 2+3i, 2-3i$

$$(x-4)(x-2-3i)(x-2+3i)$$

$$\begin{aligned} (x-2-3i)(x-2+3i) &= x^2 - 2x + 3xi - 2x + 4 - 6i - 3xi \\ &\quad - 6i + 9 \\ &= x^2 - 4x + 13 \end{aligned}$$

$$\begin{aligned} (x-4)(x^2 - 4x + 13) &= x^3 - 4x^2 + 13x - 4x^2 + 16x - 52 \\ &= x^3 - 8x^2 + 29x - 52. \end{aligned}$$

11. $3-5i, 3+5i$

$$= (x-3+5i)(x-3-5i)$$

$$= x^2 - 3x - 5xi - 3x + 9 + 15i + 5xi - 15i + 25$$

$$= x^2 - 6x + 34$$

12 (a) $2x^2 - 4x + 7 = 0$

$$ax^2 + bx + c = 0$$

$$\text{Sum} = -\frac{b}{a} = -\frac{-4}{2} = 2$$

$$\text{Product} = \frac{c}{a} = \frac{7}{2}$$

$$(b) 4x^3 - 3x^2 - 5x + 2 = 0$$

$$\text{sum} = - \frac{-3}{4} = \frac{3}{4}$$

$$\text{product} = - \frac{2}{4} = -\frac{1}{2}$$