

1. In an effort to reduce plastic waste, a company decides to cut its production by 4.5% per year over the next 4 years.

At present, it produces 5.3 million tonnes of plastic.

- a) Calculate the amount of plastic waste produced after the 4 year period. Round your answer correct to 3 significant figures. (4)

- b) Calculate the overall percentage reduction over this period (2)

2. A function has equation  $f(x) = 27 - 2x^3$   
Evaluate  $f(-2)$ . (2)

- 3 A graph has equation  $y = x^2 + 8x - 5$ .

- a) Express  $x^2 + 8x - 5$  in the form  $(x + a)^2 + b$  (2)

- b) Find the equation of the axis of symmetry of the graph of  $y = x^2 + 8x - 5$  (1)

4. State the gradient and y-intercept of the line with equation

$$4x + 3y + 18 = 0 \quad (2)$$

5. An athlete changed her daily training routine to burn an extra 15% of calories.

If she now burns 2150 calories, how many did she burn before she changed her routine? (3)

- 6a Factorise  $2x^2 + 3x - 20$  (2)

- 6b. Hence simplify

$$\frac{4x^2 - 25}{2x^2 + 3x - 20} \quad (2)$$

7. Expand and simplify

$$(x - 3)(x + 2)(x + 5) \quad (3)$$

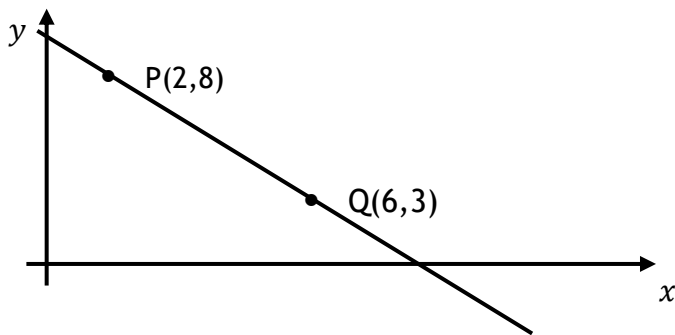
- 8a. Simplify

$$(3p^{\frac{1}{2}}q^{-2})^2 \quad (2)$$

- 8b. Express with a rational denominator in its simplest form

$$\frac{6}{\sqrt{8}} \quad (3)$$

9. Find the equation of the line PQ shown below.



(3)

10. In Barstucks, 2 small cappuccinos and 3 large cappuccinos cost £15.

a. Write down an equation to represent this information. (1)

Three small cappuccinos and one large cappuccino costs £11.30. (1)

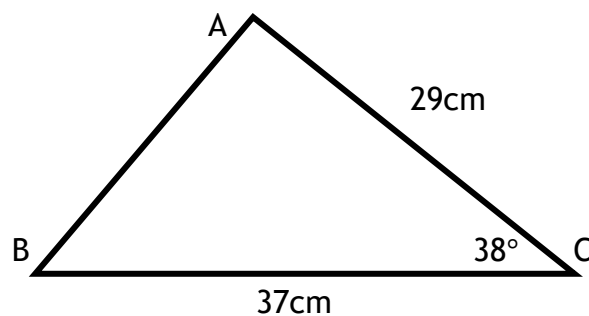
b. Write down a second equation to represent this information.

c. Solve these equations to find the cost of one small cappuccino and the cost of one large cappuccino. (3)

11. A function has equation  $f(x) = 7x - 4$ .

If  $f(a) = 24$ , find the value of  $a$ . (2)

12. Calculate the length of AB in the triangle below



(3)