GCSE (9-1) Mathematics

J560/05 Paper 5 (Higher Tier)

Question Set 2

1. Work out $(2 \times 10^3) \times (4 \times 10^4)$, giving your answer in standard form.

.... **[2]**

2. Ed has a card shop.

(a) He buys a particular card for £1.20 and sells it for £1.68.

Calculate his percentage profit on this card.

(a) .... % **[3]**

(b) Ed's profit on "Good Luck" cards in 2018 was £360.
This was a decrease of 20% on his profit in 2017.

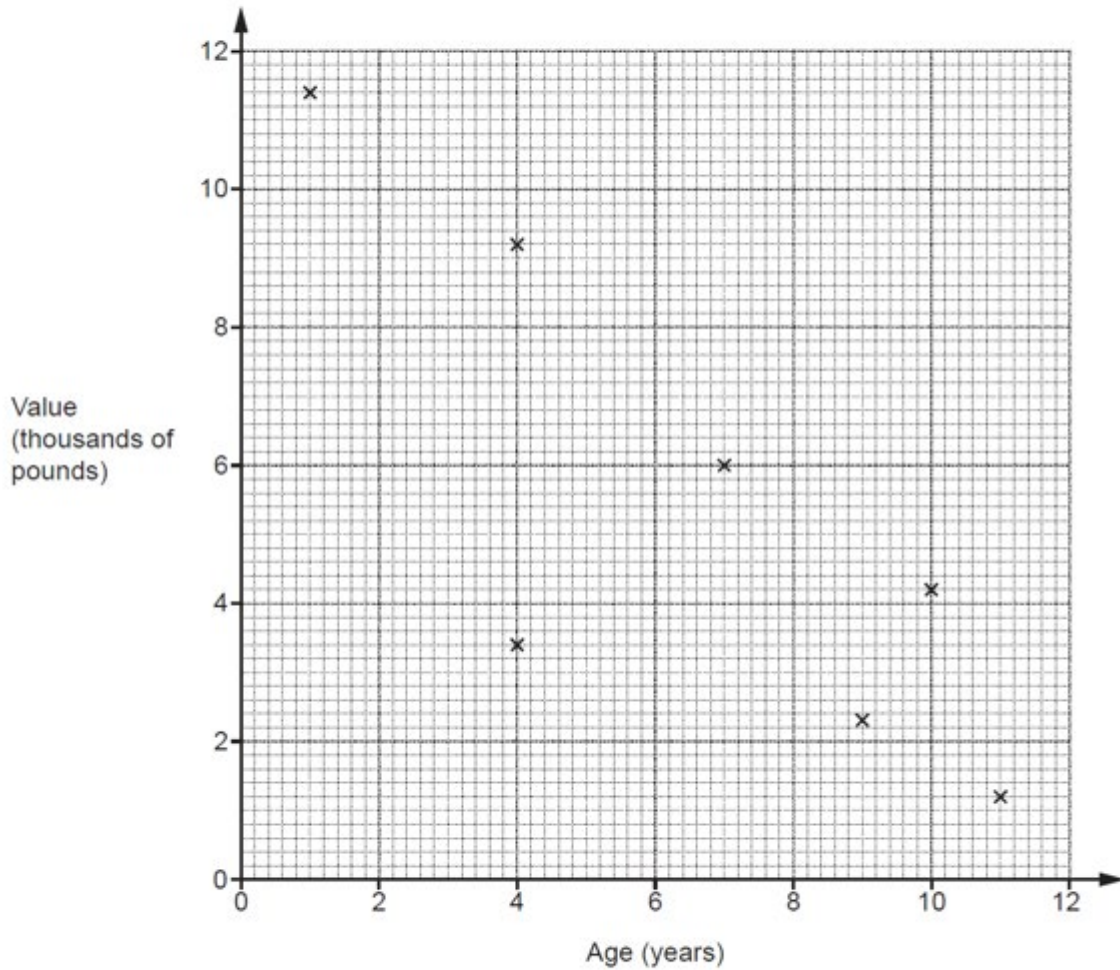Work out Ed's profit on "Good Luck" cards in 2017.

(b) £ .... **[3]**

3.

The table shows the ages and values of 11 cars of the same model.

Age (years)	4	7	11	1	9	10	4	3	7	8	12
Value (thousands of pounds)	9.2	6.0	1.2	11.4	2.3	4.2	3.4	8.0	5.6	5.0	0.4

The points for the first 7 cars are plotted on the scatter diagram.

Age (years)

(a) Plot the points for the remaining 4 cars. [2]

(b) Describe the type and strength of the correlation shown in the completed scatter diagram.

.... [2]

(c) One car lost its value more quickly than the other cars.

On the scatter diagram, draw a circle around the point representing this car. **[1]**

(d) By drawing a line of best fit, estimate the value of a car that is 6 years old.

(d) £ .... **[2]**

(e) Explain the limitations of using the equation of the line of best fit to estimate the value of a car that is 16 years old.

....

.... **[1]**

4.

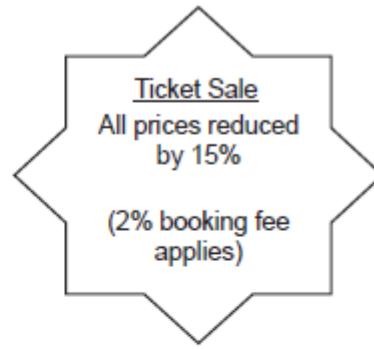Adam buys some theatre tickets in a sale.

The normal prices are:

        £80 for each adult
        £40 for each child.

In the sale, the prices are reduced by 15%.
Adam buys 2 adult tickets and 1 child ticket at the sale price.
A 2% booking fee is then added to the total cost of the tickets.

Calculate the total amount that Adam must pay.

Ticket Sale
All prices reduced
by 15%

(2% booking fee
applies)

£ .... **[6]**

5. **(a)** Simplify fully.

$$\sqrt{200}$$

(a) .... [2]

(b) Evaluate.

$$8^{\frac{1}{3}}$$

(b) .... [1]

6. Here are two functions.

Function A $\quad x \longrightarrow \boxed{\times 3} \longrightarrow \boxed{-2} \longrightarrow y$

Function B $\quad x \longrightarrow \boxed{+7} \longrightarrow \boxed{\times 2} \longrightarrow y$
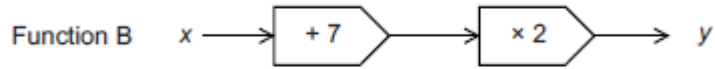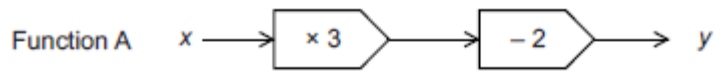
(a) Find an algebraic expression for the output of the **inverse** of function A when the input is x.
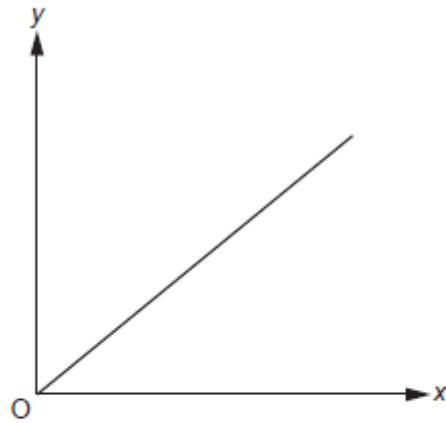
(a) .... **[2]**

(b) Here is a composite function C.

Function C $\quad x \longrightarrow \boxed{\text{Function A}} \longrightarrow \boxed{\text{Function B}} \longrightarrow z$
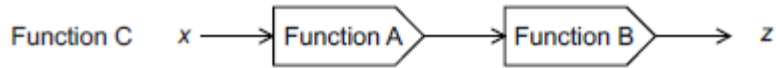
Find the value x when $z = 4x$.

(b) $x =$ .... **[5]**

7. Shirley is asked to sketch a graph of $y = 5^x$ for $x \geqslant 0$.
She produces the following.

The graph has two errors.

How should they be corrected?

1 ....

....

2 ....

.... **[2]**

8.
In the diagram AB is parallel to CD.
AED and BEC are straight lines.
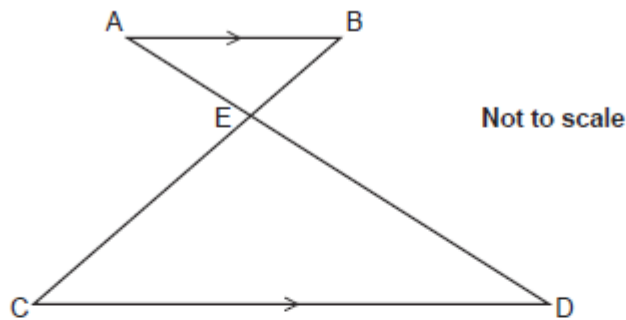
Not to scale

Prove that triangle ABE is similar to triangle CDE.

....

....

....

.... **[3]**

9. OAB is a sector of a circle, centre O.
OA = 6 cm and AX is perpendicular to OB.
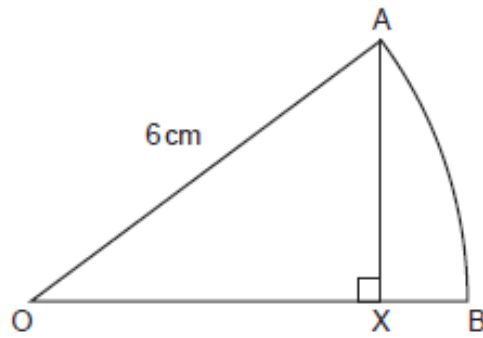
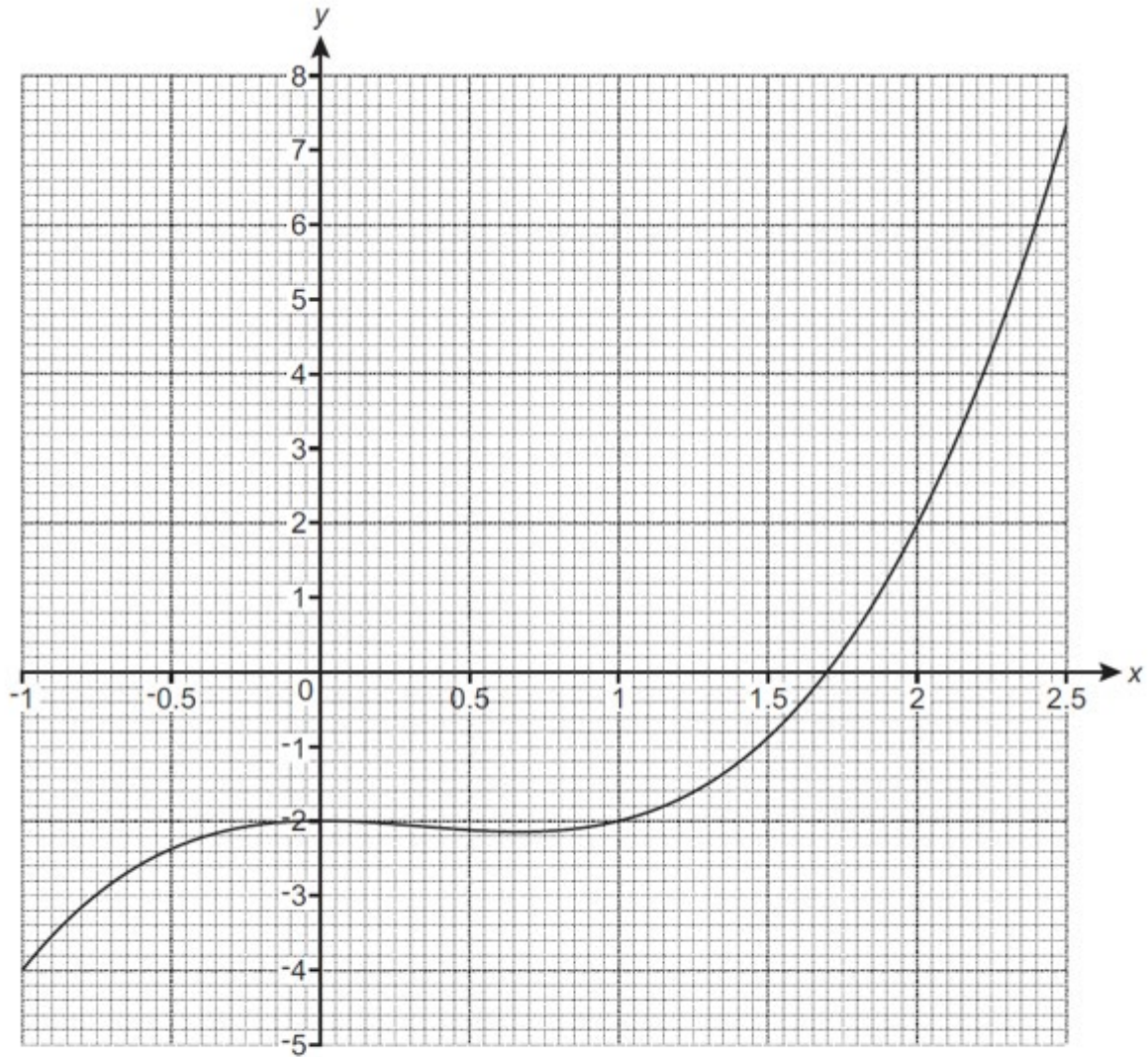**Not to scale**

The area of sector OAB is 6π cm².

Show that AX = $3\sqrt{3}$ cm. **[6]**

The graph of $y = x^3 - x^2 - 2$ is drawn on the grid.

(a) Use the graph to solve $x^3 - x^2 - 2 = 0$.
Give your answer correct to 1 decimal place.

$x =$ .... **[1]**

(b) The equation $x^3 - x^2 + 5x - 6 = 0$ can be solved by finding the intersection of the graph of $y = x^3 - x^2 - 2$ and the line $y = ax + b$.

    (i) Find the value of a and the value of b.

<div align="right">

(b)(i) $a =$ ....

$b =$ .... **[2]**

</div>

    (ii) Hence, **use the graph** to solve the equation $x^3 - x^2 + 5x - 6 = 0$.
       Give your answer correct to 1 decimal place.

<div align="right">

(ii) $x =$ .... **[3]**

</div>

Total Marks for Question Set 2: 49