Silver Level

Model Answers 4

Level	IGCSE
Subject	Maths
Exam Board	Edexcel
Difficulty Level	Gold
Booklet	Model Answers 4

Time Allowed: **51 minutes**

Score: **/ 42**

Percentage: **/100**

1 Showing clear algebraic working, solve the simultaneous equations

$3a + 2b =$ (1)

$a + 2b = 5$ (2)

(2) − (1)

$(a - 3a) + (2b - 2b) = 5 - 1$

$-2a = 4$

$a = -2$

Sub a into (2)

$-2 + 2b = 5$

$2b = 7 \therefore b = 3.5$

$a =$ −2

$b =$ 3.5

(Total for Question is 3 marks)

2 (a) Expand and simplify

(i) $5(2x + 1) - 3(3x - 1)$

$10x + 5 - 9x + 3 = x + 8$

$x + 8$

(ii) $(y + 5)(y - 7)$

$y^2 + y(-7) + 5(y) + 5(-7)$

$y^2 - 7y + 5y - 35$

$y^2 - 2y - 35$

$y^2 - 2y - 35$

(4)

(b) Make r the subject of the formula $V = \pi r^2 h$ where r is positive.

$\frac{V}{h} = \pi r^2 \rightarrow \frac{V}{\pi h} = r^2$

$\rightarrow r = \sqrt{\frac{V}{\pi h}}$

$r =$ $\sqrt{\frac{V}{\pi h}}$

(2)

(Total for Question is 6 marks)

3 The mass of the Space Shuttle is 7.8×10^4 kilograms.

(a) Write 7.8×10^4 as an ordinary number.

7·8 × 10 000

78000

78000

(1)

The Space Shuttle docks with the International Space Station.
The mass of the International Space Station is 4.62×10^5 kilograms.

(b) Calculate the total mass of the Space Shuttle and the International Space Station.
Give your answer in standard form.

$4.62 \times 10^5 + 7.8 \times 10^4$

$(46.2 + 7.8) \times 10^4$

5.4×10^5

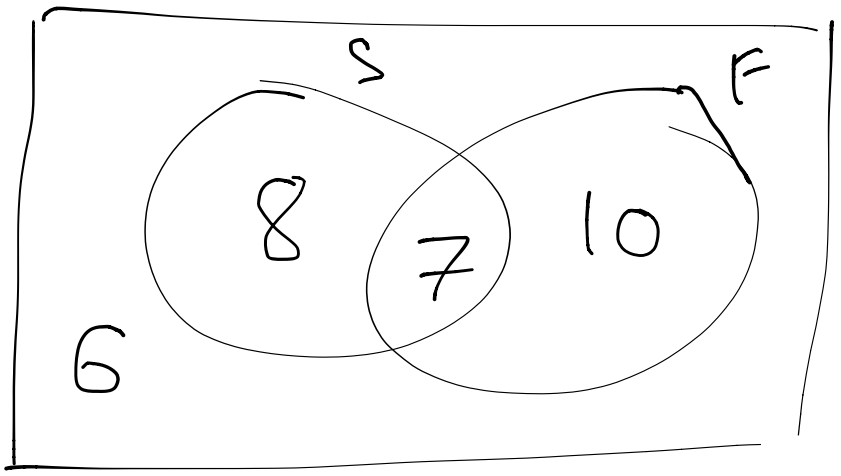
5.4×10^5 kg

(2)

(Total for Question is 3 marks)

4 There are 31 students in a class.
The only languages available for the class to study are French and Spanish.
17 students study French.
15 students study Spanish.
6 students study neither French nor Spanish.

Using a Venn diagram, or otherwise, work out how many students study only one language.



8+10

31-6=25

17+15-25=7

num who study both

18

(Total for Question is 4 marks)

5 Solve the simultaneous equations

$$y - 2x = 6 \quad (1)$$
$$y + 2x = 0 \quad (2)$$

Show clear algebraic working.

(2) − (1)

$(y - y) + 2x - (-2x) = 0 - 6$

$0 + 4x = -6$

$x = -1.5$

Sub in (2)

$y + (-3) = 0$

$y = +3$

$x =$ -1.5 / 3

$y =$ .....

(Total for Question is 3 marks)

6 The table shows the diameters, in kilometres, of five planets.

Planet	Diameter (km)
Venus	1.2×10^4
Jupiter	1.4×10^5
Neptune	5.0×10^4
Mars	6.8×10^3
Saturn	1.2×10^5

(a) Which of these planets has the smallest diameter?

10^3 is smallest

Mars

.....

(1)

(b) Calculate the difference, in kilometres, between the diameter of Saturn and the diameter of Neptune.
Give your answer in standard form.

Sat: $1.2 \times 10^5 \rightarrow 12 \times 10^4$ → $(12 - 5) \times 10^4$

Nep: 5.0×10^4 ↗ $= 7 \times 10^4$

7×10^4

..... km

(2)

The diameter of the Moon is 3.5×10^3 km.
The diameter of the Sun is 1.4×10^6 km.

(c) Calculate the ratio of the diameter of the Moon to the diameter of the Sun.
Give your answer in the form 1 : *n*

Moon : Sun

$3.5 \times 10^3 : 1.4 \times 10^6 \rightarrow \frac{3.5 \times 10^3}{3.5 \times 10^3} : \frac{1.4 \times 10^6}{3.5 \times 10^3}$

$\rightarrow 1 : \frac{1.4}{3.5} \times 10^3$

$\rightarrow 1 : 400$

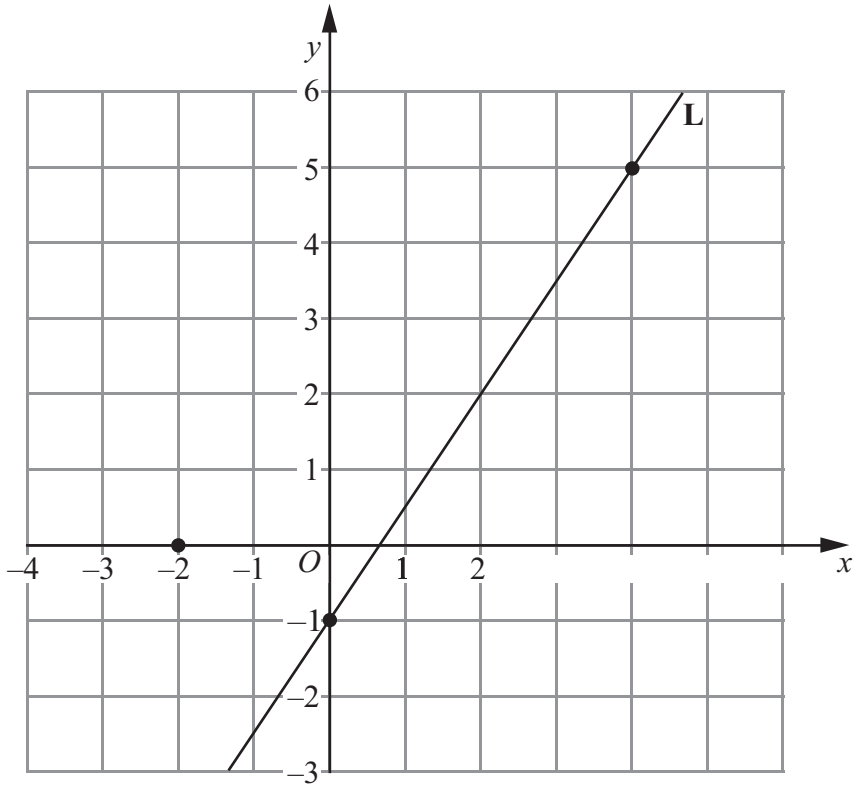
1 : 400

.....

(2)

(Total for Question is 5 marks)

7 The points (0, –1) and (4, 5) lie on the straight line **L**.



(a) Work out the gradient of **L**.

$\frac{y_2 - y_1}{x_2 - x_1} = \frac{5 - -1}{4 - 0} = 3/2$

1.5

(2)

(b) Write down an equation of **L**.

$y = mx + c \quad (= -1$

$y = 1.5x + (\rightarrow$

$y = 1.5x - 1$

(1)

(c) Find an equation of the line which is parallel to **L** and passes through the point (– 2, 0)

$m_1 = m_2$ as parallel $\rightarrow y = 1.5x + 3$

$\rightarrow y - y_1 = m(x - x_1)$

$\rightarrow y - 0 = 1.5(x - -2)$

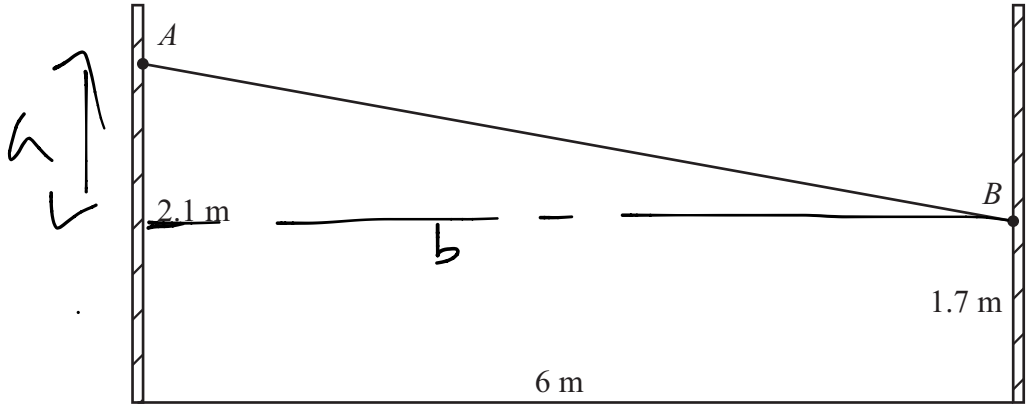
$y = 1.5x + 3$

(2)

(Total for Question is 5 marks)

8 A washing line is attached at points *A* and *B* on two vertical posts standing on horizontal ground.
Point *A* is 2.1 metres above the ground on one post.
Point *B* is 1.7 metres above the ground on the other post.
The horizontal distance between the two posts is 6 metres.

Diagram **NOT** accurately drawn



Calculate the distance *AB*.
Give your answer correct to 3 significant figures.

$a = 2.1 - 1.7 = 0.4$

$AB^2 = a^2 + b^2$

$AB = \sqrt{(0.4)^2 + 6^2} = \sqrt{36.16}$

≈ 6.01

6.01 m

(Total for Question is 4 marks)

9 Make h the subject of the formula $A = 2\pi r(r + h)$

$\frac{A}{2\pi} = r(r+h$

$\frac{A}{2\pi} = r^2 + rh$

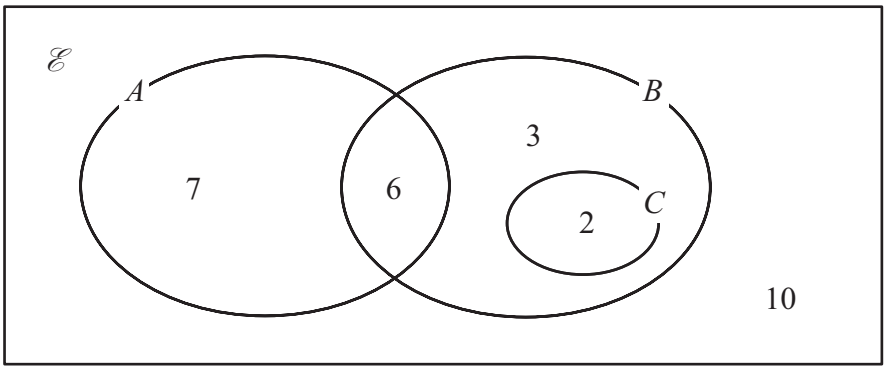
$\frac{A}{2\pi} - r^2 = rh$

$\frac{A}{2\pi r} - r = h$

$h = \frac{A}{2\pi r} - r$

(Total for Question is 2 marks)

10 The Venn diagram shows a universal set $\mathscr{E}$ and three sets A, B and C.



7, 6, 3, 2 and 10 represent the **numbers** of elements.

Find

(i) $\mathrm{n}(A \cup B)$

7 + 6 + 3 + 2

18

(ii) $\mathrm{n}(A')$

10 + 3 + 2

15

(iii) $\mathrm{n}(B \cap C')$

6 + 3

9

(iv) $\mathrm{n}(A' \cup B')$

7 + 3 + 2 + 10

22

(Total for Question is 4 marks)

11

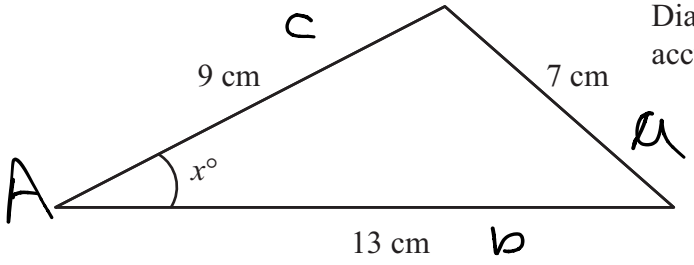


Diagram **NOT** accurately drawn

Calculate the value of x.
Give your answer correct to 1 decimal place.

Cosine rule $a^2 = b^2 + c^2 - 2bc\cos(A)$

$7^2 = 9^2 + 13^2 - 2(9)(13)\cos(A)$

$234\cos(A) = 201$

$\cos A = \frac{201}{234}$ $A \approx 30.8°$

$x =$ 30.8°

(Total for Question is 3 marks)

12 The diagram shows a rectangular playground of width x metres and length $3x$ metres.

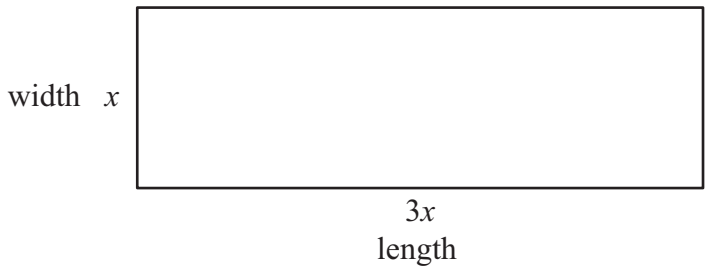


Diagram **NOT** accurately drawn

The playground is extended, by adding 10 metres to its width and 20 metres to its length, to form a larger rectangular playground.

The area of the larger rectangular playground is double the area of the original playground.

(a) Show that $3x^2 - 50x - 200 = 0$

$A_1 = 3x \times x = 3x^2$

$A_2 = (3x + 20) \times (x + 10)$

$2A_1 = A_2$

$6x^2 = (3x + 20)(x + 10) \rightarrow 6x^2 = 3x^2 + 50x + 200$ QED

(3)

(b) Calculate the area of the original playground.

$3x^2 - 50x - 200$

$(3x + 10)(x - 20) = 0$

$x = -\frac{10}{3}$ $x = 20$

$A_1 = 3 \times 20^2 = 1200\ m^2$

1200 ..... m^2

(5)

(Total for Question is 8 marks)