

Write your name here

Surname	Other names
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Pearson
Edexcel GCSE

Centre Number

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Candidate Number

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Nov 2015 Predicted Paper 1

Higher Tier

Time: 1 hour 45 minutes

Paper Reference

1MA0/1H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks



Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- **Calculators must not be used.**

Information

- The total mark for this paper is 100
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk (*)** are ones where the quality of your written communication will be assessed.

Advice

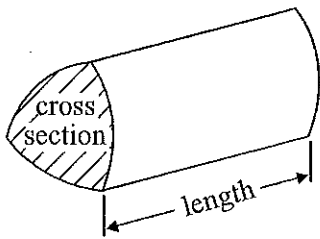
- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

GCSE Mathematics 1MA0

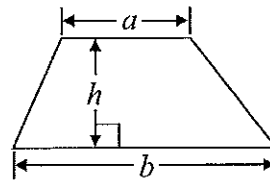
Formulae: Higher Tier

**You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.**

Volume of prism = area of cross section \times length

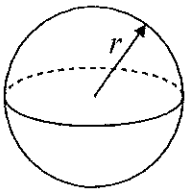


Area of trapezium = $\frac{1}{2} (a + b)h$



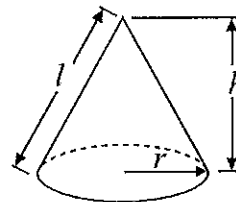
Volume of sphere = $\frac{4}{3} \pi r^3$

Surface area of sphere = $4\pi r^2$

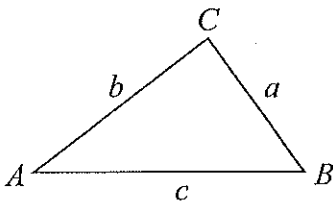


Volume of cone = $\frac{1}{3} \pi r^2 h$

Curved surface area of cone = $\pi r l$



In any triangle ABC



The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$
where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Sine Rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine Rule $a^2 = b^2 + c^2 - 2bc \cos A$

Area of triangle = $\frac{1}{2} ab \sin C$

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

- 1 Glen buys four tickets for a concert.
Each ticket costs £54

Glen also has to pay a booking fee.
The booking fee is 5% of the total price of the tickets.

Work out the total amount Glen has to pay.

$$4 \times £54 = £216$$

$$10\% = £21.60$$

$$5\% = £10.80$$

$$\begin{array}{r} 216.00 \\ 10.80 \\ \hline 226.80 \end{array}$$

£ 226.80

(Total for Question 1 is 3 marks)

2 Charles wants to find out how much people spend on sweets.

He will use a questionnaire.

(a) Design a suitable question for Charles to use in his questionnaire.

(2)

How much money do you spend on sweets
a week?

0 £1-£2 £3-£4 £5 or
more

Charles asks the people in his class to do his questionnaire.

(b) Give a reason why this may not be a suitable sample.

(1)

All participants will be the same age.

(Total for Question 2 is 3 marks)

3 Here is a list of ingredients for making a peach dessert for 6 people.

Peach dessert for 6 people.

150 g jelly
10 sponge fingers
500 ml custard
200 g peaches

Bob is going to make a peach dessert for 15 people.

Work out the amount of each ingredient he needs.

$$6 + 6 + 3 = 15$$

$$\text{ingredients} \times 2.5$$

$$150 \times 2.5$$

$$10 \times 2.5$$

$$500 \times 2.5$$

$$200 \times 2.5$$

375

g jelly

25

sponge fingers

1250

ml custard

500

g peaches

(Total for Question 3 is 3 marks)

4 A leisure centre has a swimming pool and a gym.

Here are the ages of the 16 people in the swimming pool.

~~54~~ ~~43~~ ~~15~~ ~~16~~ ~~42~~ ~~23~~ ~~20~~ ~~18~~
~~36~~ ~~32~~ ~~45~~ ~~10~~ ~~14~~ ~~48~~ ~~13~~ ~~46~~

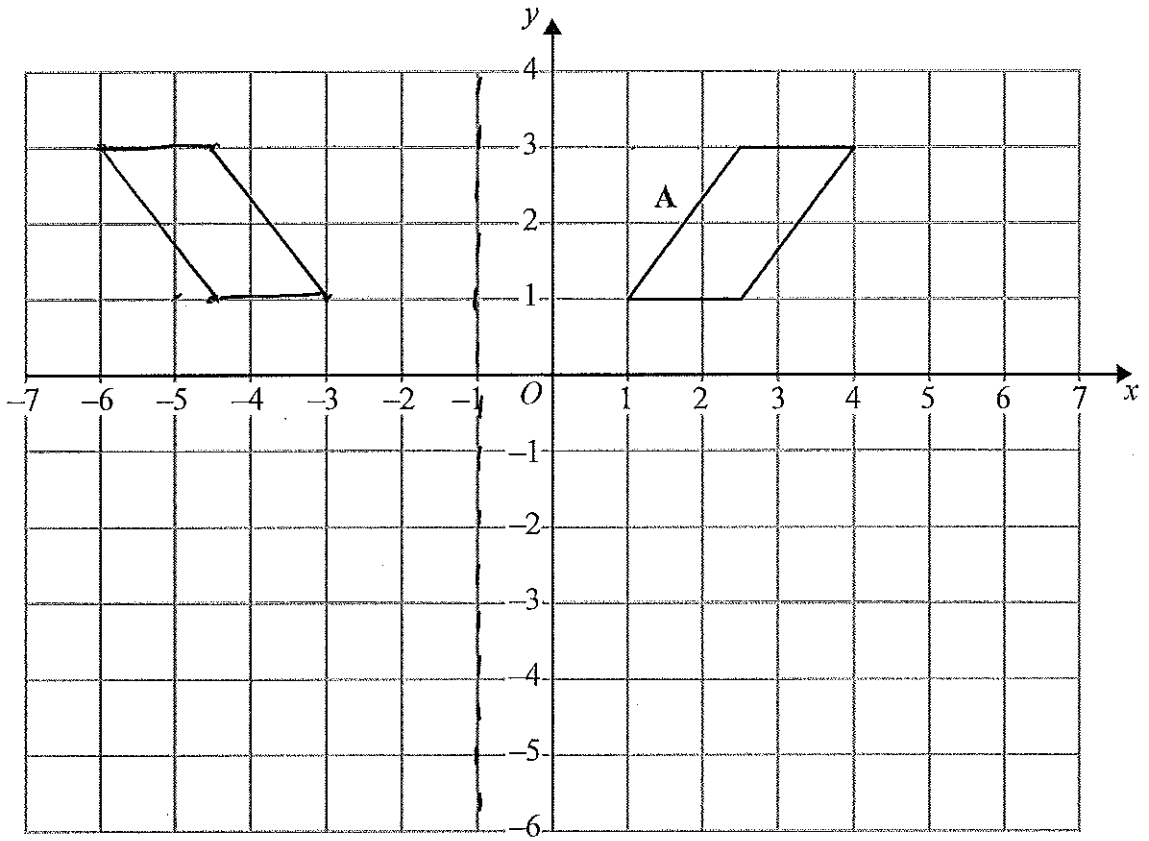
Show this information in an ordered stem and leaf diagram.

1	0 3 4 5 6 8
2	0 3
3	2 6
4	2 3 5 5 6
5	4

$1|0 = 10 \text{ years}$

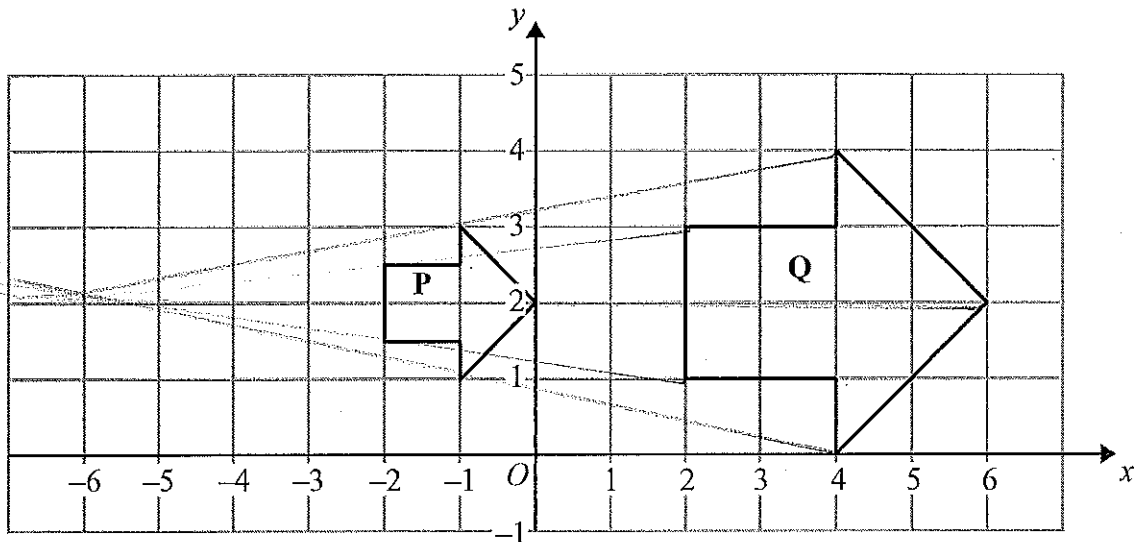
(Total for Question 4 is 3 marks)

5



(a) Reflect shape A in the line $x = -1$

(2)



(b) Describe fully the single transformation that maps shape P onto shape Q.

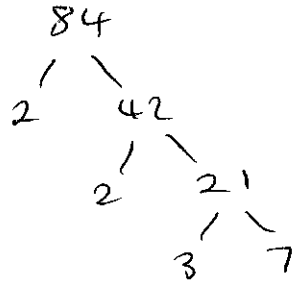
enlargement, scale factor 2, centre (-6, 2)

(3)

(Total for Question 5 is 5 marks)

6 (a) Express 84 as a product of its prime factors.

(2)



$$\underline{2 \times 2 \times 3 \times 7}$$

Sally is a patient in a hospital.

She has to take a red pill every 4 hours, a blue pill every 6 hours and a white pill every 8 hours.

She takes a pill of each colour at midday.

(b) When will she next take a pill of each colour at the same time?

(2)

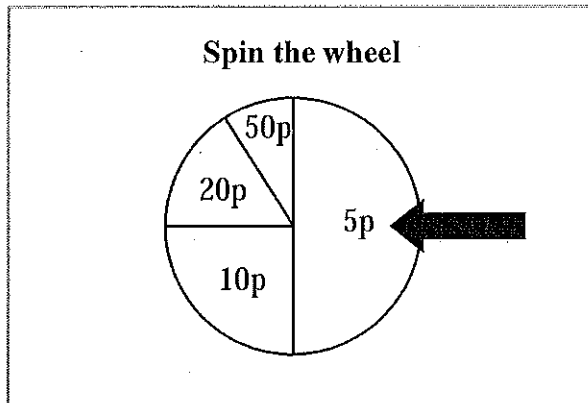
4 8 12 16 20 (24)

6 12 18 (24)

8 16 (24)

24 hours later.

(Total for Question 6 is 4 marks)



Bert has a game at a fair.

In the game players pay to spin a wheel.

When the wheel stops, the amount shown by the arrow is given to the player.

The table shows the probabilities that the wheel will stop on 5p, on 10p, on 20p and on 50p.

	5p	10p	20p	50p
Probability	0.5	0.25	0.15	0.1

Bert wants to make a profit from the game.

Work out the minimum he can charge players to spin the wheel.

$$\begin{array}{r}
 0.5 \times 5 = 2.5 \\
 0.25 \times 10 = 2.5 \\
 0.15 \times 20 = 3 \\
 0.1 \times 50 = 5
 \end{array}$$

13p

(He would need to charge 14p to make a profit)

$$\begin{array}{r}
 14p \\
 \underline{13p}
 \end{array}$$

8 Tony buys and sells cars.

He has to reach a target of at least 40% profit on each car he sells.

On Monday, Tony buys a car for £1500

On Tuesday, Tony sells the car for £2150

Show that Tony reaches his target for this car.

1500

$$10\% = 150$$

$$20\% = 300$$

$$40\% = 600$$

$$£1500 + £600 = £2100$$

A 40% profit would be £2100.

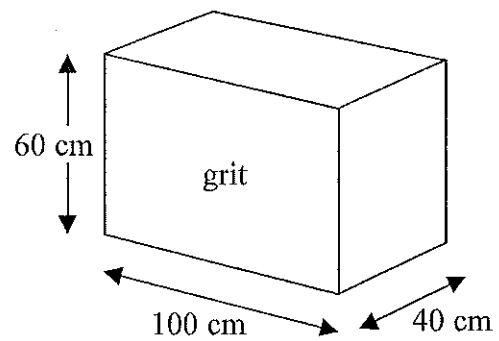
Tony exceeded this target.

(Total for Question 8 is 3 marks)

- *9 The diagram shows a box for winter grit.
The box is in the shape of a cuboid.
The box is empty.

Jon wants to fill the box with grit.
A bag of grit costs £2.50
There are 8000 cm³ of grit in a bag.
Jon has £70 to spend on the grit.

Diagram NOT
accurately drawn



Does Jon have enough money to buy all the grit he needs
to fill the box completely?

$$\begin{aligned} \text{Volume} &= 60 \times 100 \times 40 \\ &= 240000 \text{ cm}^3 \end{aligned}$$

$$\frac{240000}{8000} = \frac{120}{4} = \frac{60}{2} = 30$$

Jon needs 30 bags

$$30 \times \pounds 2.50 = \pounds 75$$

Jon does not have enough money

(Total for Question 9 is 5 marks)

10 (a) Factorise fully

$$8p^2q + 12p$$

$$4p(2pq + 3)$$

(2)

$$\underline{4p(2pq + 3)}$$

(b) Expand and simplify

$$5 - 2(m - 3)$$

$$5 - 2m + 6$$

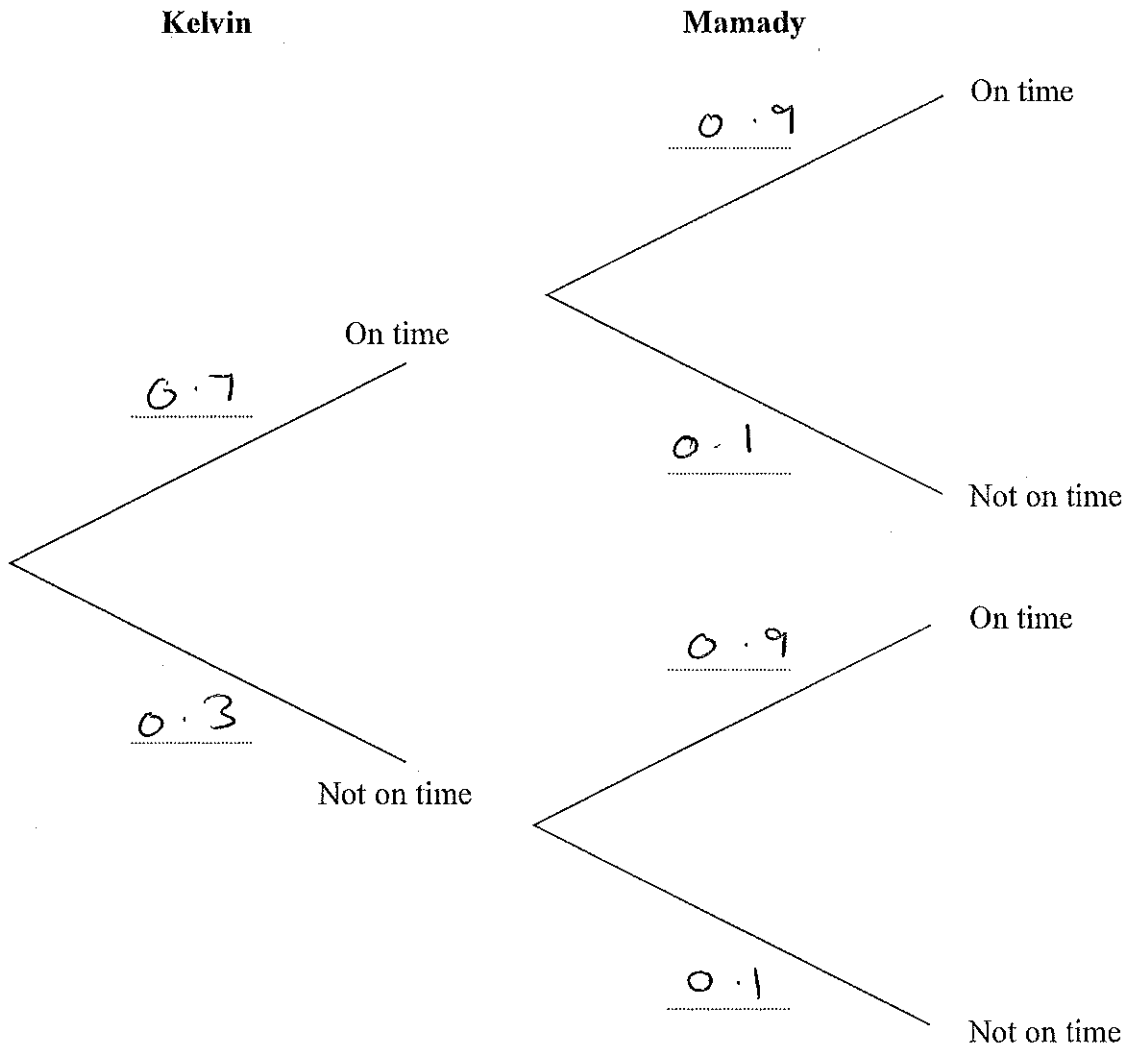
(2)

$$\underline{11 - 2m}$$

(Total for Question 10 is 4 marks)

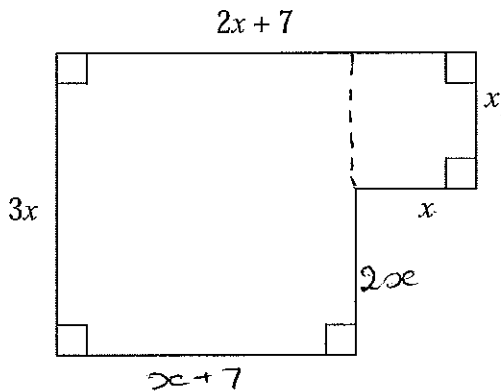
- 11 Kelvin and Mamady are in the same class.
The probability that Kelvin arrives on time is 0.7
The probability that Mamady arrives on time is 0.9

Complete the probability tree diagram.



(Total for Question 11 is 2 marks)

12 The perimeter of this shape is 22 cm.



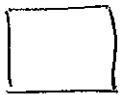
All measurements are in centimetres

Find the area.

$$22 = 10x + 14$$

$$8 = 10x$$

$$x = 0.8$$



$$3(0.8) \times 7.8$$

$$2.4 \times 7.8$$



$$0.8 \times 0.8 = 0.64$$

	20	4
70	1400	280
8	160	32

$$\begin{array}{r} 1400 \\ 280 \\ 160 \\ 32 \\ \hline 1872 \end{array}$$

$$\begin{array}{r} 18.72 \\ 0.64 \\ \hline 19.36 \end{array}$$

$$\underline{\underline{19.36}} \text{ cm}^2$$

(Total for Question 12 is 5 marks)

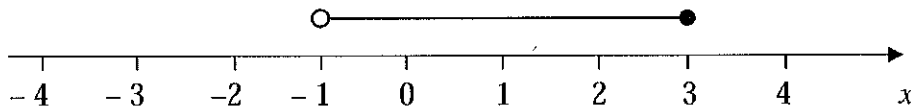
13 $-3 \leq n < 2$

n is an integer.

(a) Write down all the possible values of n .

(2)

-3, -2, -1, 0, 1



(b) Write down the inequalities represented on the number line.

(2)

-1 < x ≤ 3

(Total for Question 13 is 4 marks)

14 Make q the subject of the formula $r = \frac{2q - 4}{3}$

$$3r = 2q - 4$$

$$3r + 4 = 2q$$

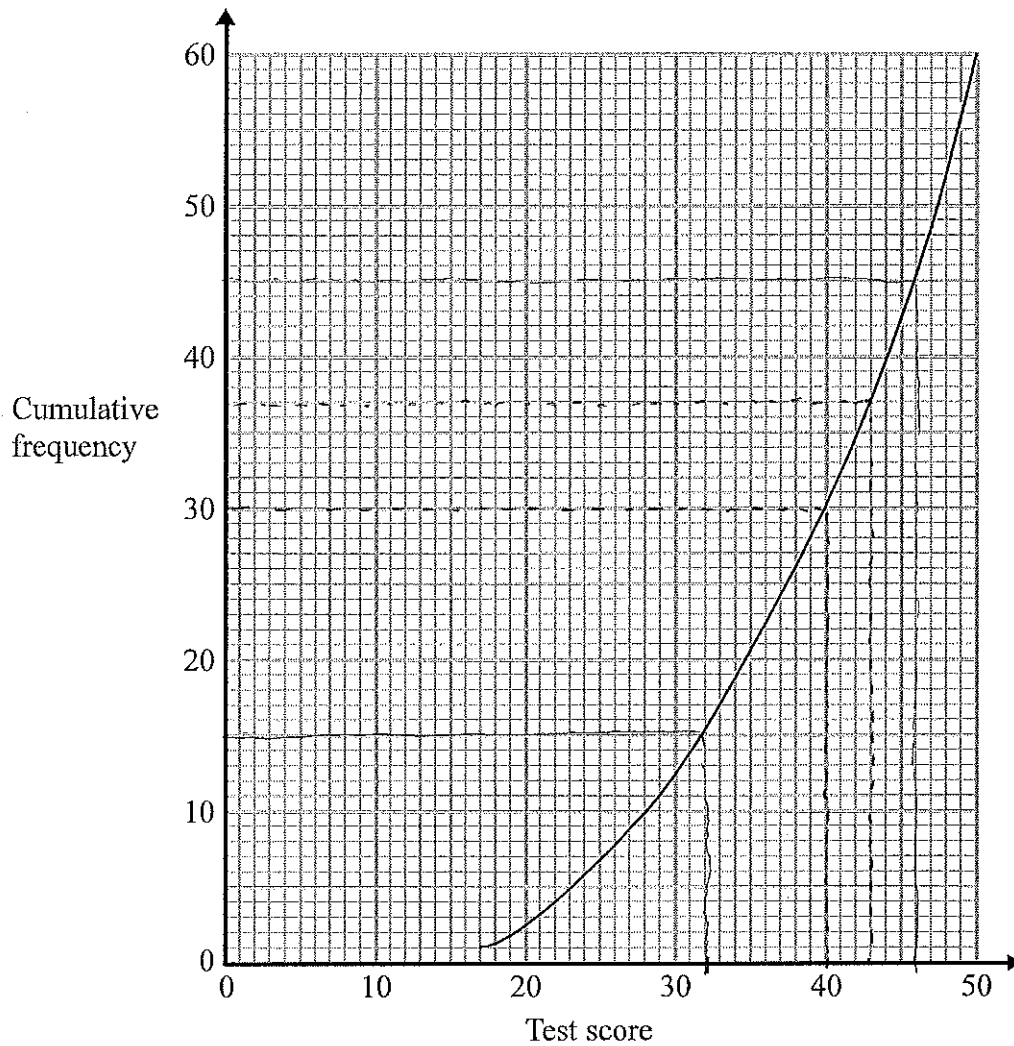
$$\frac{3r + 4}{2} = q$$

$$q = \frac{3r + 4}{2}$$

(Total for Question 14 is 3 marks)

15 60 people took a driving theory test.

The cumulative frequency graph shows information about their test scores.



(a) Use the graph to find an estimate for the median test score.

$$\frac{40}{(1)}$$

People pass the test when their test score is 43 or more.

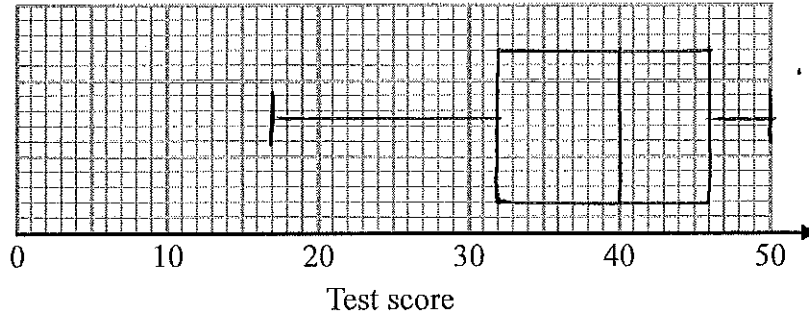
(b) Find an estimate for the number of these people who passed the test.

$$60 - 37$$

$$\frac{23}{(2)}$$

The lowest test score was 17
The highest test score was 50

(c) Use this information and the information from the cumulative frequency graph to draw a box plot.



(3)

(Total for Question 15 is 6 marks)

16 (a) Write 450 000 in standard form.

$$\frac{4.5 \times 10^5}{(1)}$$

(b) Write 3.2×10^{-4} as an ordinary number.

$$\frac{0.00032}{(1)}$$

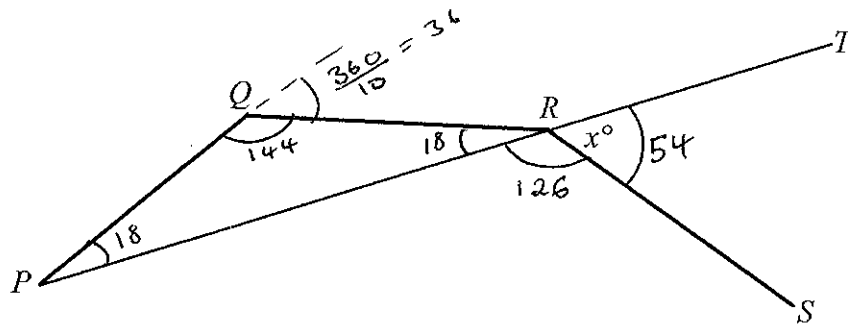
(c) Work out $\sqrt[3]{6.4 \times 10^{10}}$

$$\begin{aligned} \sqrt[3]{6.4 \times 10^9} &= \sqrt[3]{64} \times \sqrt[3]{10^9} \\ &4 \times 10^3 \end{aligned}$$

$$\frac{4000}{(1)}$$

(Total for Question 16 is 3 marks)

17

Diagram NOT
accurately drawn

PQ , QR and RS are 3 sides of a regular decagon.
 PRT is a straight line.
 Angle $TRS = x^\circ$

Work out the value of x

$$\text{Exterior angle} = \frac{360}{10} = 36$$

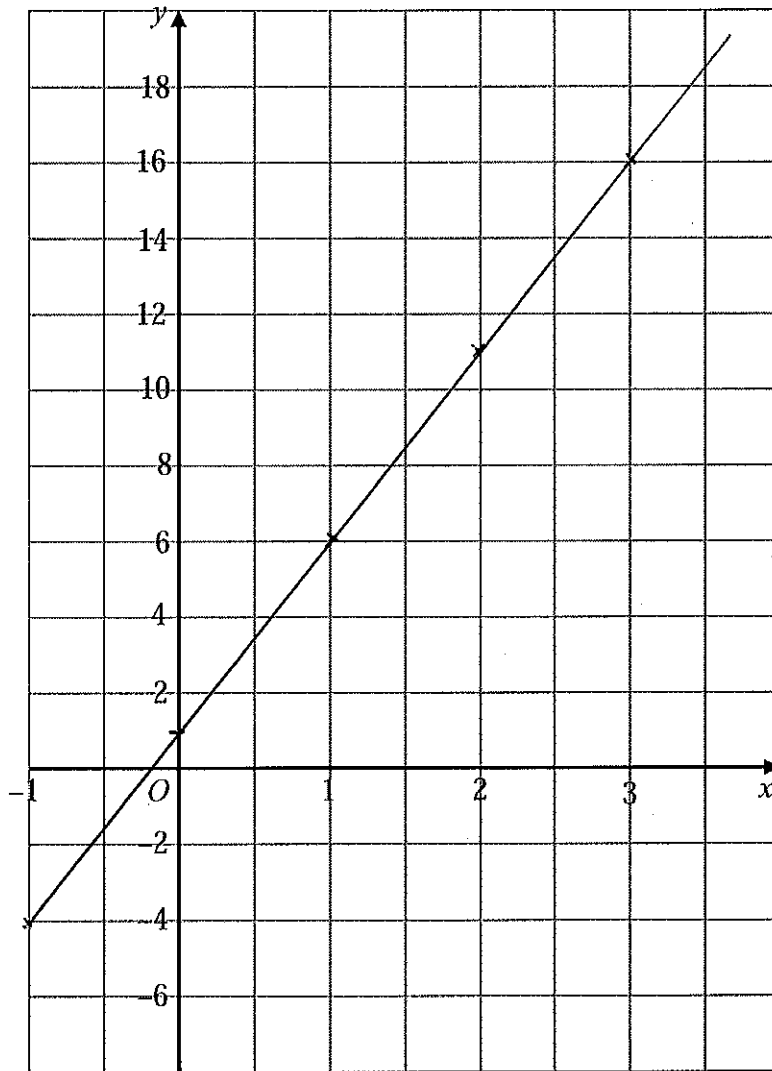
$$\text{Interior angle} = 180 - 36 = 144$$

$$x = \dots\dots\dots 54$$

(Total for Question 17 is 5 marks)

18 (a) On the grid, draw the graph of $y = 5x + 1$ from $x = -1$ to $x = 3$

(3)



(b) Which of the following is the equation of a line parallel to $y = 5x + 1$?

(1)

- A** $y = x + 1$
 B $5y = x + 1$
 C $y + 5x = 3$
 D $y - 5x + 1 = 0$
 E $y = -\frac{x}{5} + 1$

D

(c) Find the equation of line which is perpendicular to $y = 5x + 1$ and passes through the point $(0, 0)$.

perp gradient = $-\frac{1}{5}$

(2)

$y = -\frac{1}{5}x$

(Total for Question 18 is 6 marks)

19 Solve the simultaneous equations

$$3x + 2y = 11 \quad \times 2$$

$$2x - 5y = 20 \quad \times 3$$

$$6x + 4y = 22$$

$$6x - 15y = 60$$

$$19y = -38$$

$$y = -2$$

$$3x + 2(-2) = 11$$

$$3x - 4 = 11$$

$$3x = 15$$

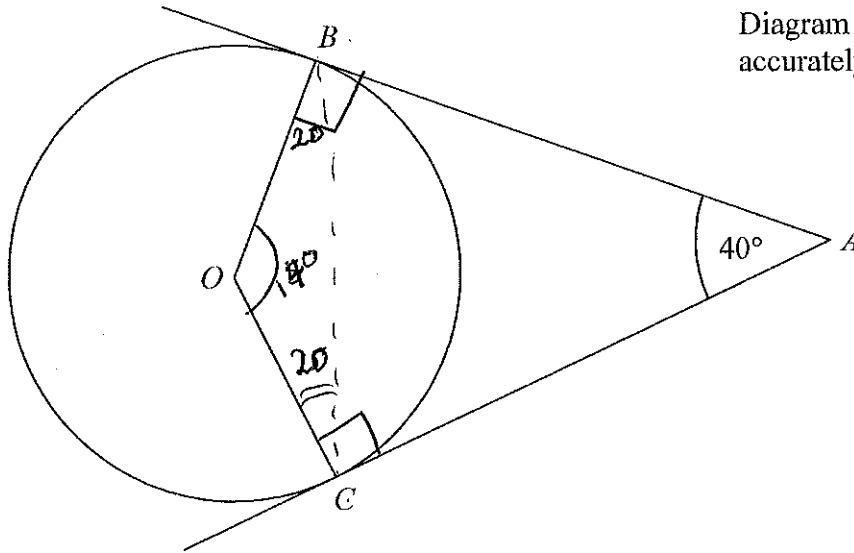
$$x = 5$$

$$x = \dots \dots \dots 5 \dots \dots \dots$$

$$y = \dots \dots \dots -2 \dots \dots \dots$$

(Total for Question 19 is 4 marks)

Diagram **NOT**
accurately drawn



B and C are points on the circumference of a circle, centre O .
 AB and AC are tangents to the circle.
 Angle $BAC = 40^\circ$.

Find the size of angle BCO .

Where tangent meets radius is 90°

Angles in a quadrilateral add up to 360°

$$\therefore BOC = 140^\circ$$

Angles at the base of an isosceles triangle are equal

20
~~15~~

(Total for Question 20 is 3 marks)

21. Simplify fully $\frac{3x^2 - 6x}{x^2 + 2x - 8}$

$$\frac{3x(x-2)}{(x+4)(x-2)}$$

$$\frac{3x}{x+4}$$

(Total for Question 21 is 3 marks)

22 Find the value of

(i) 8^0

1

(ii) $\left(\frac{1}{3}\right)^{-2}$

$$\left(\frac{3}{1}\right)^2$$

9

(iii) $(16^{-2})^{\frac{3}{4}} = 16^{\frac{6}{4}} = 16^{3/2}$

$$16^{\frac{3}{2}} = 4^3 = 64$$

64

(Total for Question 22 is 4 marks)

23 Simplify fully $\frac{x+3}{4} + \frac{x-5}{3}$

$$\frac{3(x+3)}{12} + \frac{4(x-5)}{12}$$

$$\frac{3x+9+4x-20}{12}$$

$$\frac{7x-11}{12}$$

$$\frac{7x-11}{12}$$

(Total for Question 23 is 3 marks)

24 The diagram shows a regular hexagon $OABCDE$.

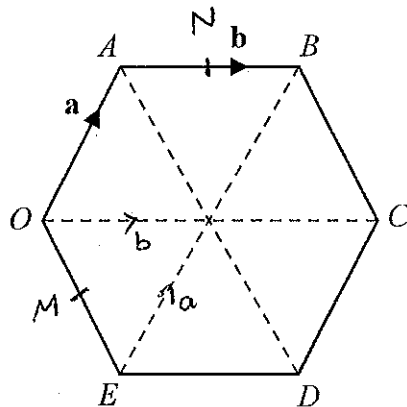


Diagram NOT accurately drawn

$$\vec{OA} = \mathbf{a}$$

$$\vec{AB} = \mathbf{b}$$

M is the midpoint of OE .

N is the midpoint of AB .

(a) Find \vec{MN} in terms of \mathbf{a} and/or \mathbf{b} .

$$\vec{EO} = \mathbf{a} - \mathbf{b}$$

$$\vec{MO} = \frac{1}{2}\mathbf{a} - \frac{1}{2}\mathbf{b}$$

$$\begin{aligned} \vec{MN} &= \frac{1}{2}\mathbf{a} - \frac{1}{2}\mathbf{b} + \mathbf{a} + \frac{1}{2}\mathbf{b} \\ &= \frac{3}{2}\mathbf{a} \end{aligned}$$

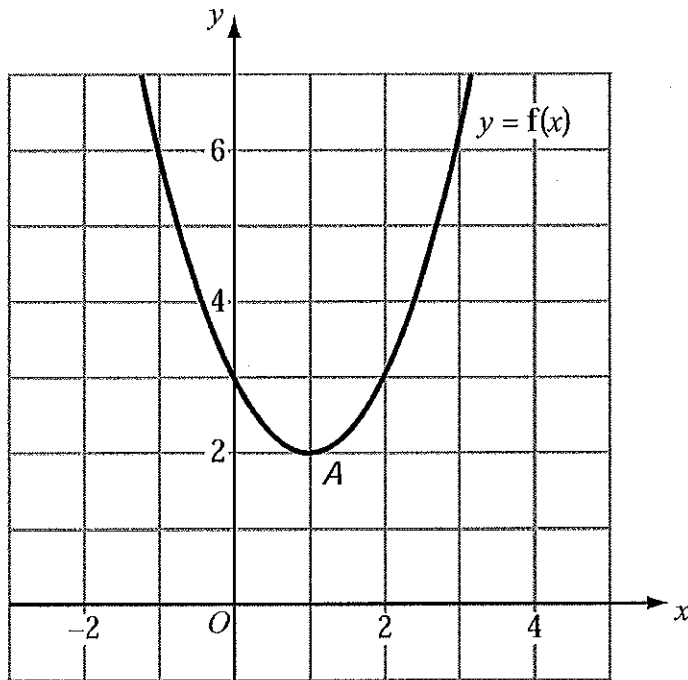
$$\vec{MN} = \frac{3}{2}\mathbf{a} \quad (3)$$

(b) Describe fully what your answer to part (a) shows about the lines OA and MN .

they are parallel - because \vec{MN} is a multiple of \vec{OA}

(2)

(Total for Question 24 is 5 marks)



The diagram shows the graph of $y = f(x)$.

The only vertex of the graph is A at $(1, 2)$.

Write down the coordinates of the vertex of the curve with equation.

(a) (i) $y = f(x) + 3$

(1)

1, 5

(ii) $y = f(x - 2)$

(1)

3, 2

The curve with equation $y = f(x)$ is transformed to give the curve with equation $y = -f(x)$

(b) Describe the transformation.

(1)

reflected over the x axis

(Total for Question 25 is 3 marks)

26 These 6 coins are in a box.

10p	10p	10p	20p	20p	50p
-----	-----	-----	-----	-----	-----

Pritesh takes at random 2 coins from the box.

Work out the probability that the total value of the 2 coins is at least 40p.

10p, 50p	$\frac{3}{6} \times \frac{1}{5} = \frac{3}{30}$
20p, 50p	$\frac{2}{6} \times \frac{1}{5} = \frac{2}{30}$
20p, 20p	$\frac{2}{6} \times \frac{1}{5} = \frac{2}{30}$
50p, 10p	$\frac{1}{6} \times \frac{3}{5} = \frac{3}{30}$
50p, 20p	$\frac{1}{6} \times \frac{2}{5} = \frac{2}{30}$

$$\frac{12}{30} \quad \text{or} \quad \frac{2}{5}$$

$$\frac{12}{30}$$

(Total for Question 26 is 4 marks)

