

Please check the examination details below before entering your candidate information

Candidate surname					Other names				
Centre Number					Candidate Number				

Pearson Edexcel Level 1/Level 2 GCSE (9–1)

Time 1 hour 30 minutes **Paper reference** **1MA1/3F**

Mathematics
PAPER 3 (Calculator)
Foundation Tier

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. 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.*
- You must **show all your working**.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.



Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

Advice

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

Turn over ►

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Pearson

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

- 1 Write 45% as a decimal. *To convert fraction to decimal, we divide by 100.*

$$\frac{45\%}{100\%} = 0.45 \quad (1)$$

0.45

(Total for Question 1 is 1 mark)

- 2 Write down two factors of 35

$$7 \times 5 = 35$$

7 and 5

(1)

(Total for Question 2 is 1 mark)

- 3 What is the time 2 hours 40 minutes after 8.05 am?

$$\begin{array}{r} \text{hours} \quad \quad \quad \text{minutes} \\ 8 : 05 \text{ a.m.} \\ + 2 : 40 \\ \hline 10 : 45 \text{ a.m.} \end{array}$$

10.45

(1)

am

(Total for Question 3 is 1 mark)

- 4 Work out $\frac{1}{6}$ of 66

$$\frac{1}{\cancel{6}} \times \frac{66}{\cancel{6}} = 11$$

11

(1)

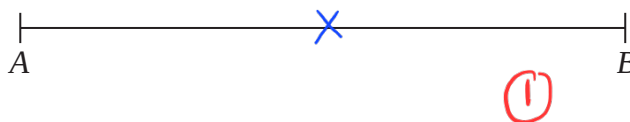
(Total for Question 4 is 1 mark)



5 AB is a straight line.

Mark with a cross ($\times$) the midpoint of AB .

midpoint means middle point



(Total for Question 5 is 1 mark)

6 (a) Simplify $a \times b \times 4$

$$a \times b \times 4 = 4ab \quad (1)$$

$$4ab$$

(1)

(b) Simplify $4x + 3 - x + 5$

$$\begin{aligned} &4x + 3 - x + 5 \\ &= \underline{4x + x} + \underline{5 + 3} \\ &= 3x + 8 \quad (1) \end{aligned}$$

Group unknowns together and integers together

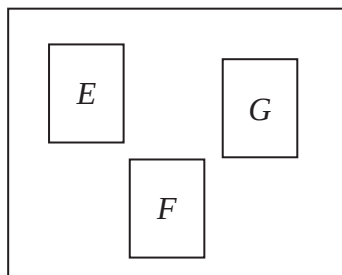
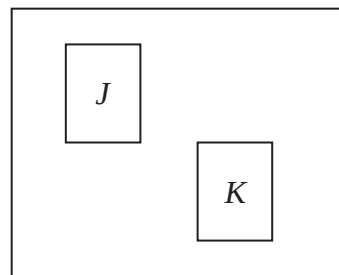
$$3x + 8$$

(2)

(Total for Question 6 is 3 marks)



- 7 There are three cards in bag **A** and two cards in bag **B**.
There is a letter on each card.

Bag **A**Bag **B**

James takes a card from bag **A** and then a card from bag **B**.

List all the possible outcomes.

EJ, EK, GJ, GK, FJ, FK

②

Any combinations with one card from A and one card from B

(Total for Question 7 is 2 marks)

- 8 On Monday, Sandy pays for 2 plane tickets, 7 nights in a hotel and 2 theme park tickets.

	dollars	
each plane ticket	600	$\times 2$
each night in a hotel	120	$\times 7$
each theme park ticket	250	$\times 2$

Show that Sandy pays more than 2500 dollars on Monday.

$$\text{Sandy pays : } (2 \times 600) + (7 \times 120) + (2 \times 250) \quad \textcircled{1}$$

$$\begin{aligned} \text{according to BIDMAS,} & \quad \leftarrow = 1200 + 840 + 500 \quad \textcircled{1} \\ \text{we need to multiply} & \quad = 2540 \quad \textcircled{1} \quad 2540 > 2500 \end{aligned}$$

the terms first before adding them together

$\therefore$ Sandy pays more than 2500

(Total for Question 8 is 3 marks)



- 9 Vadim has 56 clocks.
The clocks are only red, only blue or only black.

32 of the clocks are plastic.

5 of the 14 blue clocks are plastic.

8 of the 12 red clocks are **not** plastic.

Use this information to complete the two-way table.

	Red	Blue	Black	Total
Plastic	4	5	23	32
Not plastic	8	9	7	24
Total	12	14	30	56

this should be solved
after the other columns
are filled

③

List down the information given :

- 56 clocks (total non-plastic and plastic) } $56 - 32$ to get non-plastic clocks
- 32 plastic clocks
- 14 blue clocks (total non-plastic and plastic) } $14 - 5$ to get non-plastic blue clocks
- 5 blue plastic clocks
- 12 red clocks (total non-plastic and plastic) } $12 - 8$ to get plastic red clocks
- 8 red clocks not plastic

- Fill these information in the table first, then work out the missing bits using addition & subtraction.

(Total for Question 9 is 3 marks)

- 10 Corina has £300 to spend on books.
Each book costs £4.85

Work out the greatest number of books Corina can buy.

$$\begin{array}{l} \text{Number of books} \\ \text{Corina can buy} \end{array} : 300 \div 4.85 \quad \textcircled{1}$$

$$= 61.86 \quad \textcircled{1}$$

since the question asks
for the maximum number
of books, we need to take
only the integer

≈ 61 (greatest number of books
Corina can buy) $\textcircled{1}$

61

(Total for Question 10 is 3 marks)



11 (a) Write 196 minutes in hours and minutes.

$$1 \text{ hour} = 60 \text{ minutes}$$

$$= 196 \text{ minutes} \div 60 \text{ minutes} \quad (1)$$

$$= 3 \text{ hr } 16 \text{ mins}$$

(1)

$$\begin{array}{r} 3 \text{ hours} \\ 60 \overline{)196} \\ \underline{180} \\ 16 \text{ minutes} \end{array}$$

..... 3 hours 16 minutes
(2)

A train travels x miles in 2 hours.

miles is a unit for distance, hours is a unit

(b) Write down an expression, in terms of x , for the average speed of the train. for time

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

$$x \text{ miles} \div 2 \text{ hrs}$$

$$= \frac{x}{2} \text{ miles per hour}$$

(1)

$$\frac{x}{2}$$

..... miles per hour
(1)

(Total for Question 11 is 3 marks)

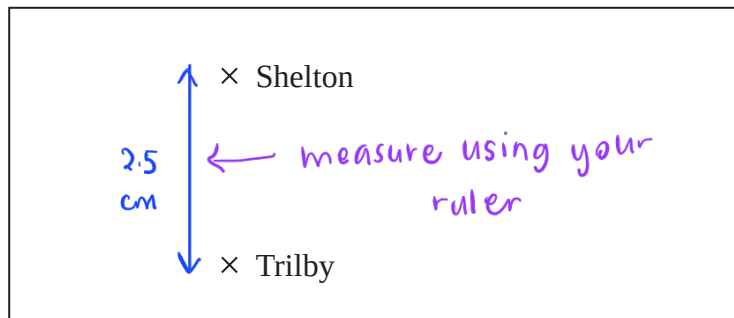
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12 The diagram shows two places on a map.



Scale: 1 centimetre represents 20 kilometres

$$1 \text{ cm} = 20 \text{ km}$$

(a) What is the actual distance, in kilometres, from Shelton to Trilby?

$$\begin{aligned} \text{distance} &: 20 \text{ km} \times 2.5 \quad \textcircled{1} \leftarrow \text{multiply our measurement} \\ &= 50 \text{ km} \quad \textcircled{1} \end{aligned}$$

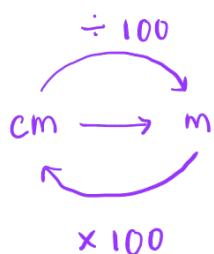
50 kilometres
(2)

On a scale drawing, the scale is given as 1 : 1200

(b) How many metres does 5 centimetres represent on this drawing?

$$1 \text{ m} = 100 \text{ cm}$$

$$1 : 1200 = 1 \text{ cm} : 1200 \text{ cm}$$



$$\begin{aligned} 5 \text{ cm} &= 1200 \times 5 \quad \textcircled{1} \\ &= 6000 \text{ cm} \div 100 \leftarrow \text{convert to metre} \\ &= 60 \text{ m} \quad \textcircled{1} \end{aligned}$$

60 metres
(2)

(Total for Question 12 is 4 marks)



13 In the Northern hemisphere the ratio of the area of land to the area of water is 2:3

(a) Work out what percentage of the area of the Northern hemisphere is land.

$$\frac{\text{Area of land}}{\text{Area of water}} = \frac{2}{3}$$

$$\text{Percentage of land} = \frac{2}{5} \times 100\% \quad (1)$$

$$\text{Total area} = 2 + 3 = 5 \quad = 40\% \quad (1)$$

$$\frac{40}{(2)}\%$$

20% of the area of the Southern hemisphere is land.

(b) Work out the ratio of the area of land to the area of water in the Southern hemisphere.

$$\frac{\text{Area of land}}{\text{Area of water}} = \frac{20}{80} = 20 : 80 \quad (1)$$

$$100\% - 20\% = 80\%$$

$$\frac{20 : 80}{(2)}$$

(Total for Question 13 is 4 marks)



14 A stadium cost £600 million.

$\frac{13}{15}$ of this cost was for the building.

The rest of the cost was for the land.

Work out the cost of the land.

Total fraction = 1

cost of land : $1 - \frac{13}{15}$

$$\frac{1 \times 15}{1 \times 15} = \frac{15}{15}$$

multiply with
the denominator

$$= \frac{15}{15} - \frac{13}{15}$$

$$= \frac{2}{15} \quad (1)$$

$$\frac{2}{15} \times \overset{40}{\cancel{600}} \text{ million} \quad (1)$$

$$= \text{£ } 80 \text{ million} \quad (1)$$

$$\begin{array}{r} 40 \\ 15 \overline{) 600} \\ \underline{60} \\ 00 \end{array}$$

£ 80 million

(Total for Question 14 is 3 marks)

15 Jenna measures all the angles around a point.

Her results are 23° , 145° , 23° and 69°

Explain why these results cannot be true.

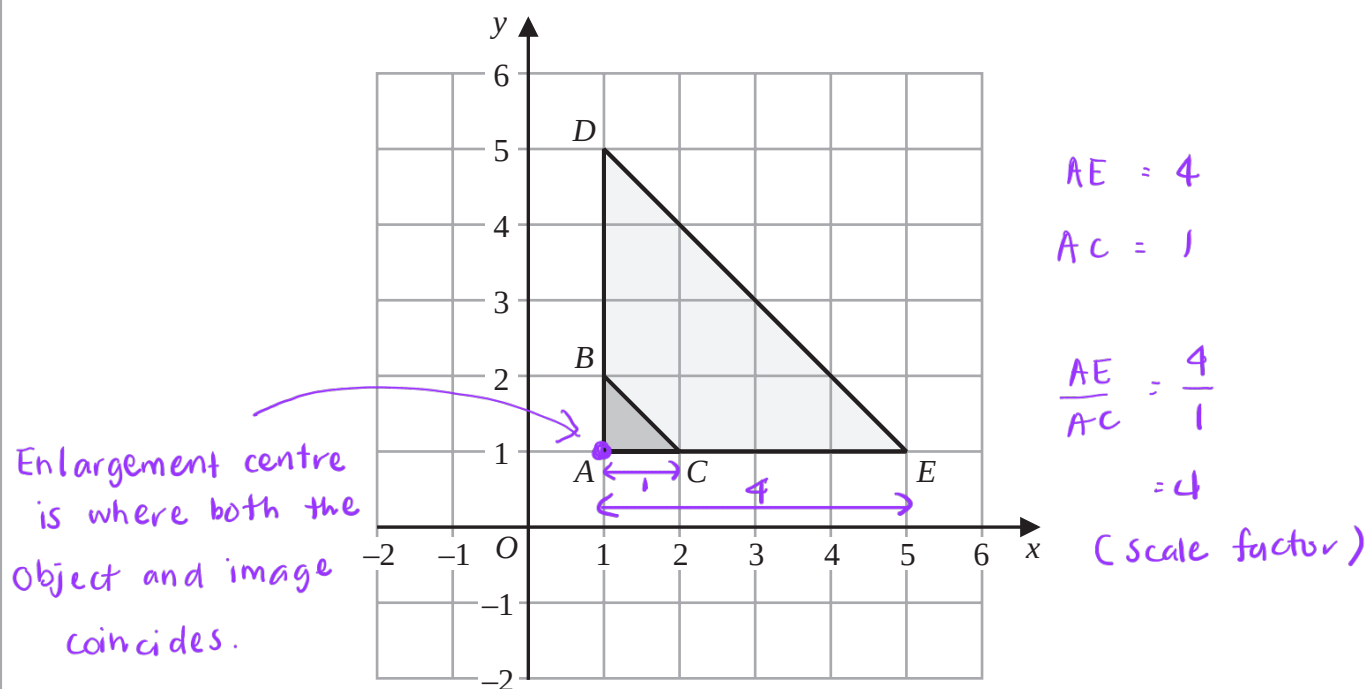
The total angle does not add up to 360° . (1)

Total angle of a complete circle is always 360° .

(Total for Question 15 is 1 mark)



16 Here is a diagram showing triangle ABC and triangle ADE .



Describe fully the single transformation that maps triangle ABC onto triangle ADE .

Enlargement with factor of 4 at point (1,1)

(2)

(Total for Question 16 is 2 marks)



17 (a) Expand $y(y+5)$

$$y(y+5) = y^2 + 5y \quad (1)$$

$$y^2 + 5y$$

(1)

(b) Factorise $4a - 6$

$$4a - 6 = 2(2a - 3) \quad (1)$$

4 and 6 are both divisible by 2.

$$2(2a - 3)$$

(1)

(c) Solve $2(5x - 4) = 21$

$$2(5x - 4) = 21$$

$$10x - 8 = 21 \quad (1)$$

isolate x terms on one side

$$10x = 29 \quad (1)$$

$$x = \frac{29}{10}$$

$$= 2.9 \quad (1)$$

$$x = 2.9$$

(3)

(d) Simplify $4e^2f \times 5ef^3$

$$4e^2f \times 5ef^3 = (4 \times 5) \cdot (e^{2+1}) \cdot (f^{1+3}) \quad (1)$$

$$= 20e^3f^4 \quad (1)$$

separate products into individual terms

$$20e^3f^4$$

(2)

(Total for Question 17 is 7 marks)

18 Change 1 m^2 into cm^2

$$1 \text{ m} = 100 \text{ cm}$$

$$1 \text{ m}^2 = (100 \text{ cm})^2$$

$$= 10000 \text{ cm}^2 \quad (1)$$

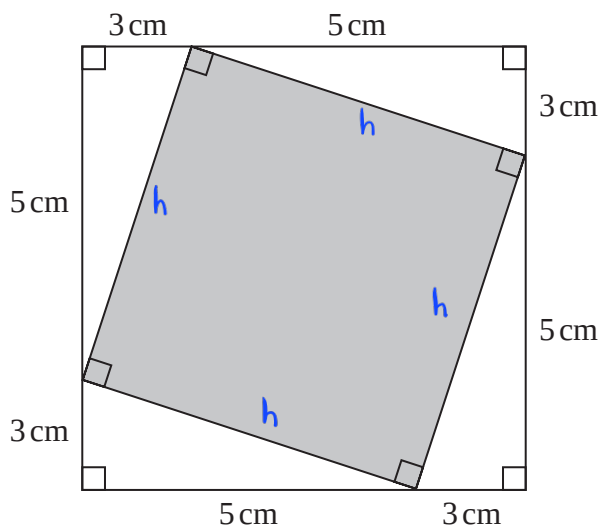
$$\times 100 \left(\begin{array}{c} \text{m} \\ \text{cm} \end{array} \right) \div 100 \quad \times 100^2 \left(\begin{array}{c} \text{m}^2 \\ \text{cm}^2 \end{array} \right) \div 100^2$$

$$10000$$

 cm^2

(Total for Question 18 is 1 mark)

19 This diagram shows two squares.



Work out the area of the square shown shaded in the diagram.

work out Pythagoras to find length h

$$h^2 = a^2 + b^2$$

$$h^2 = 3^2 + 5^2 \quad (1)$$

$$h^2 = 34$$

$$h = \sqrt{34} \quad (1)$$

Use the h value found to calculate the area of shaded
Area of shaded region : region

$$\begin{aligned} A &= h \times h \\ &= \sqrt{34} \times \sqrt{34} \\ &= 34 \text{ cm}^2 \quad (1) \end{aligned}$$

$$34 \text{ cm}^2$$

(Total for Question 19 is 4 marks)



20 Here are the heights, in centimetres, of 15 plants.

15	20	25	33	17	22	25	18
22	19	32	35	24	28	19	

Draw a stem and leaf diagram for these heights.

Tens column

Ones column

1	5 7 8 9 9
2	0 2 2 4 5 5 8
3	2 3 5

needs to be
in correct
order (smallest to largest)

②

Key: 1 | 5 = 15 cm

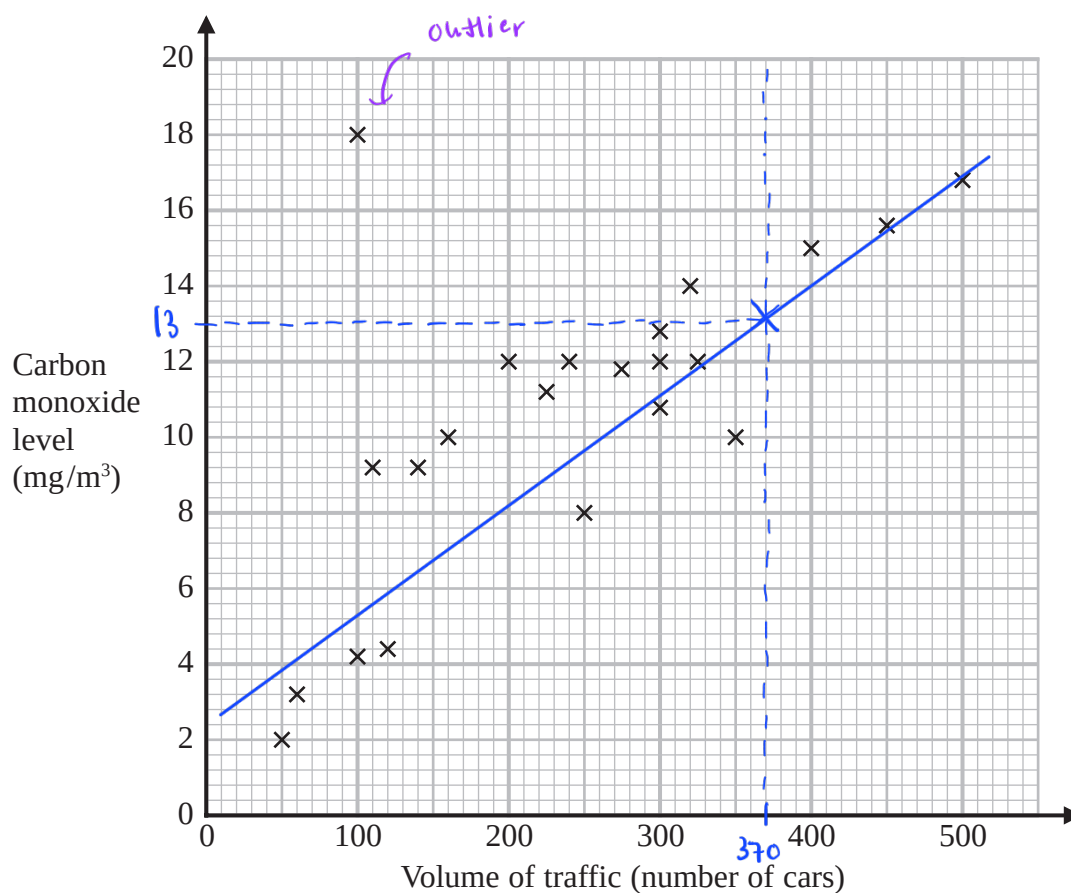
Correct unit
stated

①

(Total for Question 20 is 3 marks)



- 21 The scatter graph shows information about the volume of traffic and the carbon monoxide level at a point on a road each day for 22 days.



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One point is an outlier.

- (a) Write down the coordinates of this point.

(1)

(100, 18)

(1)

For another day, 370 cars pass the point on the road.

- (b) Estimate the carbon monoxide level for this day.

① Draw a line of best fit.

② Line up from $x = 370$.

(1)

13

..... mg/m^3

(2)

③ Intersection point between line from ① and ② will be the estimation that we need.



Alfie says,

“Because there is an outlier, there is no correlation.”

(c) Is Alfie correct?

You must give a reason for your answer.

No. Because outlier does not affect the majority.

①

(1)

(Total for Question 21 is 4 marks)

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P 6 4 6 3 3 A 0 1 5 2 4

22 Natalie makes potato cakes in a restaurant.

She mixes potato, cheese and onion so that

$$\text{weight of potato} : \text{weight of cheese} : \text{weight of onion} = 9 : 2 : 1$$

Natalie needs to make 6000 g of potato cakes.

Cheese costs £2.25 for 175 g.

Work out the cost of the cheese needed to make 6000 g of potato cakes.

Ratio of weight of potato, cheese and onion.

$$\text{Total ratio} = 9 + 2 + 1 = 12 \quad (1)$$

Amount of cheese needed for 6000 g of cakes.

$$\text{Cheese ratio for the cake} = \frac{2}{12} = \frac{1}{6}$$

$$\begin{aligned} \text{For 6000 g of cake} &= \frac{1}{6} \times 6000 \text{ g} \\ &= 1000 \text{ g of cheese} \end{aligned}$$

Cost of cheese to make 6000 g of cakes

$$175 \text{ g} = \text{£ } 2.25$$

$$1000 \text{ g} = x$$

$$x = \frac{1000 \text{ g}}{175 \text{ g}} \times \text{£ } 2.25 \quad (1)$$

$$= 5.71 \times \text{£ } 2.25 \quad (1)$$

$$= 12.86 \quad (1)$$

£ 12.86

(Total for Question 22 is 4 marks)



23 (a) Write 4.5×10^5 as an ordinary number.

$$4.5 \times 10^5 \rightarrow \text{shift the decimal point} \\ \text{5 times to the right}$$

$$= 450\,000 \quad (1)$$

$$450\,000$$

(1)

(b) Write 0.007 in standard form.

1 2 3

$$7 \times 10^{-3} \quad (1)$$

(1)

(c) Work out $4.2 \times 10^3 + 5.3 \times 10^2$

Give your answer in standard form.

$$4.2 \times 10^3 + 5.3 \times 10^2 \quad (1) \text{ Use same power,}$$

$$= \boxed{42 \times 10^2 + 5.3 \times 10^2} \quad \text{in this case, } 10^2$$

$$= 47.3 \times 10^2 \quad (1) \quad \text{for ease of calculation}$$

$$= 4.73 \times 10^3 \quad (1)$$

$$4.73 \times 10^3$$

(2)

(Total for Question 23 is 4 marks)

24 A water tank is empty.

Anil needs to fill the tank with 2400 litres of water.

Company **A** supplies water at a rate of 8 litres in 1 minute 40 seconds.

Company **B** supplies water at a rate of 2.2 gallons per minute.

1 gallon = 4.54 litres

Company **A** would take more time to fill the tank than Company **B** would take to fill the tank.

How much more time?

Give your answer in minutes correct to the nearest minute.

Rate of water supply per litre

$$\begin{aligned}\text{Company A} &= 1 \text{ minute } 40 \text{ second} \div 8 \text{ litres} \\ &= \frac{5}{24} \text{ minute per litre}\end{aligned}$$

$$\begin{aligned}\text{Company B} &= 1 \text{ minute} \div (2.2 \times 4.54 \text{ l}) \\ &= \frac{250}{2497} \text{ minute per litre} \quad (1)\end{aligned}$$

Time taken to fill the tank

$$\begin{aligned}\text{Company A} &: \frac{5}{24} \text{ minute per litre} \times 2400 \text{ litre} \\ &= 500 \text{ minutes} \quad (1)\end{aligned}$$

$$\begin{aligned}\text{Company B} &: \frac{250}{2497} \text{ minute per litre} \times 2400 \text{ litre} \\ &= 240.28 \text{ minutes} \quad (1)\end{aligned}$$

(Total for Question 24 is 4 marks)

$$\begin{aligned}\text{Company A} - \text{Company B} \\ &= 500 - 240.28 \\ &= 259.71 \text{ minute} \quad (1) \\ &\approx 260 \text{ minute}\end{aligned}$$

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25 The first four terms of a Fibonacci sequence are

$$a \quad 2a \quad 3a \quad 5a$$

The sum of the first five terms of this sequence is 228

Work out the value of a .

$$\begin{aligned} 5\text{th term} &= 3\text{rd term} + 4\text{th term} \\ &= 3a + 5a \\ &= 8a \quad (1) \end{aligned}$$

$$\begin{aligned} S_5 &= a + 2a + 3a + 5a + 8a \\ &= 19a \quad (1) \end{aligned}$$

$$19a = 228$$

$$a = 12 \quad (1)$$

12

(Total for Question 25 is 3 marks)



- 26 In a bag there are only red counters, blue counters, green counters and pink counters. A counter is going to be taken at random from the bag.

The table shows the probabilities of taking a red counter or a blue counter.

Colour	red	blue	green	pink
Probability	0.05	0.15	0.5	0.3

The probability of taking a green counter is 0.2 more than the probability of taking a pink counter.

- (a) Complete the table.

$$P(G) = 0.2 + P(P) \quad \text{--- (1)}$$

$$P(G) + P(P) = 1 - (0.05 + 0.15) \quad \text{--- (2)}$$

$$= 0.8 \quad \text{--- (1)}$$

(1) into (2)

$$0.2 + P(P) + P(P) = 0.8$$

(2)

There are 18 blue counters in the bag. $P(P) = 0.3$, so $P(G) = 0.5$ (1)

- (b) Work out the total number of counters in the bag.

Total probability = 1.0, Total counters = x
 Blue counter probability = 0.15, Blue counters = 18

$$\frac{x}{1} = \frac{18}{0.15}$$

$$x = \frac{18}{0.15} \quad \text{--- (1)}$$

120

$$= 120 \quad \text{--- (1)}$$

(2)

(Total for Question 26 is 4 marks)

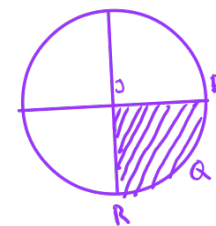
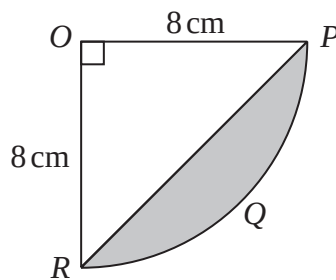
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27 The diagram shows a sector $OPQR$ of a circle, centre O and radius 8 cm.



Area of $OPQR$

$$= \frac{1}{4} \times \pi \times r^2$$

→ quarter of circle

OPR is a triangle.

Work out the area of the shaded segment PQR .

Give your answer correct to 3 significant figures.

$$\begin{aligned} \text{Area of circle } OPQR &= 0.25 \times \pi \times 8^2 \\ &= 16\pi \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Area of triangle } OPR &= \frac{1}{2} \times 8 \times 8 \\ &= 32 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Area of shaded region} &= \text{Area of circle } OPQR - \\ &\quad \text{Area of triangle } OPR \end{aligned}$$

$$= 16\pi - 32$$

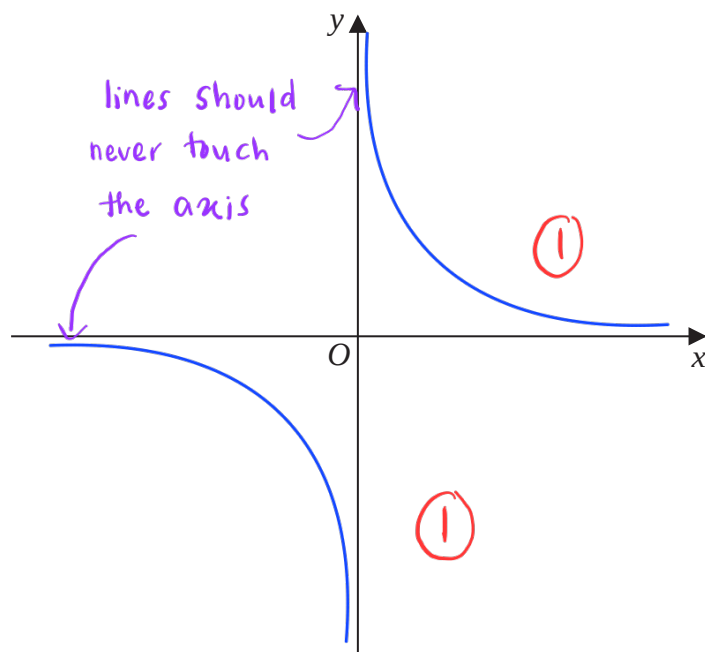
$$= 18.3 \text{ cm}^2$$

18.3

..... cm²

(Total for Question 27 is 4 marks)

28 Sketch the graph of $y = \frac{1}{x}$



(Total for Question 28 is 2 marks)

TOTAL FOR PAPER IS 80 MARKS

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