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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P 6 4 6 3 3 A 0 1 2 4

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.

$\frac{45\%}{100\%} = 0.45$ (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?

hours ↘ ↙ minutes

8 : 05 a.m

+ 2 : 40

10 : 45 a.m

10.45 (1) am

(Total for Question 3 is 1 mark)

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

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

11 (1)

(Total for Question 4 is 1 mark)

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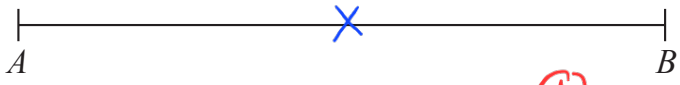
5 AB is a straight line.

Mark with a cross (×) the midpoint of AB.

midpoint means middle point



(1)

(Total for Question 5 is 1 mark)

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

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

$4ab$

(1)

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

$4x + 3 - x + 5$

Group unknowns together and integers together

$= 4x + x + 5 + 8$

$= 3x + 8$ (1)

$3x+8$

(2)

(Total for Question 6 is 3 marks)

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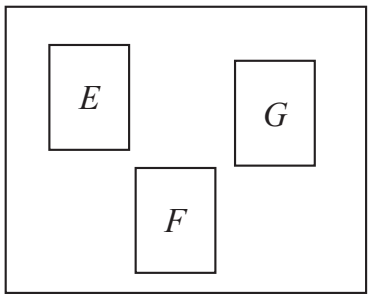
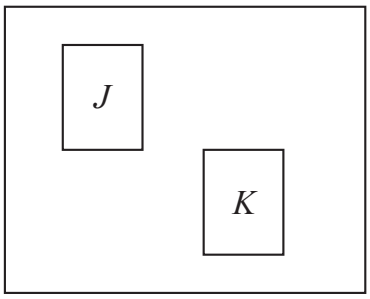
7 There are three cards in bag **A** and two cards in bag **B**.
There is a letter on each card.



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	x 2
each night in a hotel	120	x 7
each theme park ticket	250	x 2

Show that Sandy pays more than 2500 dollars on Monday.

Sandy pays : $(2 \times 600) + (7 \times 120) + (2 \times 250)$ (1)

according to BIDMAS, we need to multiply the terms first before adding them together

$= 1200 + 840 + 500$ (1)

$= 2540$ (1) $2540 > 2500$

∴ 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.

this should be solved after the other columns are filled

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

(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 clock
- 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 workout the missing bits using addition & substraction.

(Total for Question 9 is 3 marks)

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

Work out the greatest number of books Corina can buy.

Number of books Corina can buy :

$300 \div 4.85$ (1)

$= 61.86$ (1)

≈ 61 (greatest number of books Corina can buy)

(1)

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

61

(Total for Question 10 is 3 marks)

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

1 hour = 60 minutes

= 196 minutes ÷ 60 minutes (1)

= 3 hr 16 mins

(1)

3 hours

60 | 196

180

16 minutes

3 hours 16 minutes

(2)

A train travels x miles in 2 hours.

miles is a unit for distance, hours is a unit for time

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

speed = distance / time

x miles ÷ 2 hrs

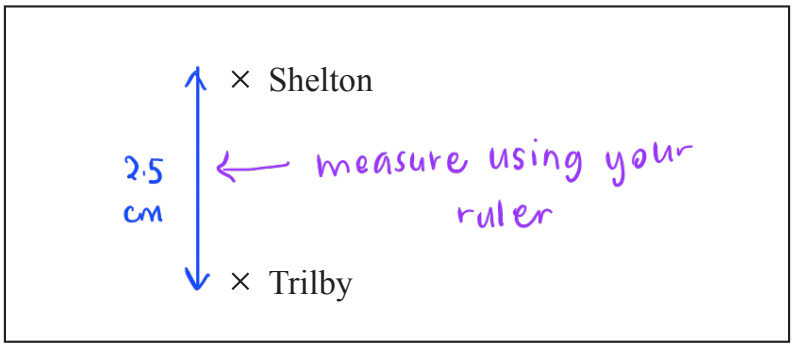
$= \frac{x}{2}$ miles per hour (1)

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

(1)

(Total for Question 11 is 3 marks)

12 The diagram shows two places on a map.



Scale: 1 centimetre represents 20 kilometres

1 cm = 20 km

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

distance : 20 km × 2.5 (1) ← multiply our measurement with the scale

: 50 km (1)

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 m = 100 cm

1 : 1200 = 1 cm : 1200 cm

5 cm : 1200 × 5 (1)

: 6000 cm ÷ 100 ← convert to metre

: 60 m (1)

÷ 100 cm → m × 100

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.

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

area of land

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

Total area $= 2 + 3 = 5$

$= 40\%$ (1)

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.

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

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

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 : $1 - \frac{13}{15}$

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

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

$1 \times 15 = 15$

$1 \times 15 = 15$

multiply with the denominator

$\frac{2}{15_1} \times £\cancel{600}^{40}$ million (1)

$= £80$ million (1)

$15 \overline{)600}$ → 40, 60, 0, 0

£ 80 million

(Total for Question 14 is 3 marks)

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15 Jenna measures all the angles around a point.

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

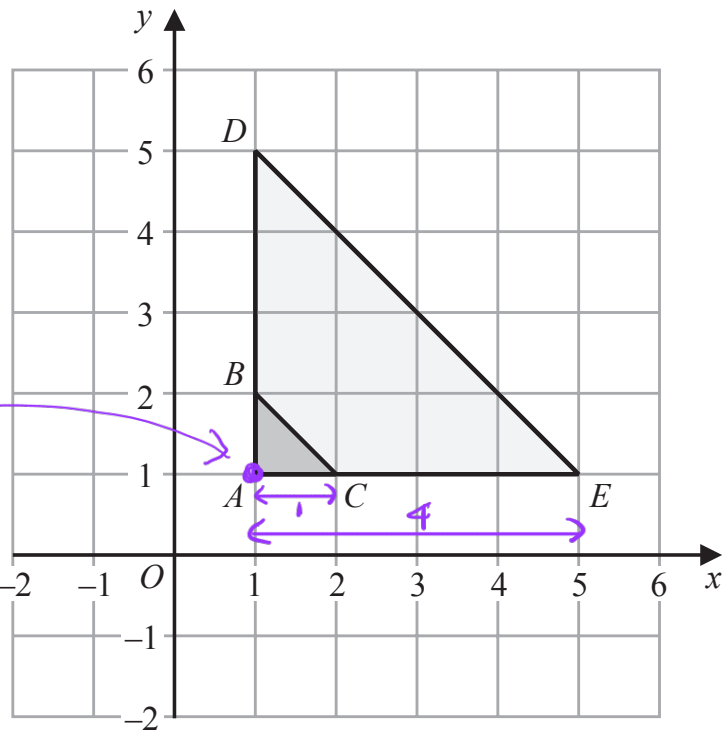
Explain why these results cannot be true.

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*.



Enlargement centre is where both the object and image coincides.

AE = 4

AC = 1

$\frac{AE}{AC} = \frac{4}{1}$

= 4 (scale factor)

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 $y(y + 5)$

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

$y^2 + 5y$

(1)

(b) Factorise $4a - 6$

$4a - 6$

$= 2(2a - 3)$ (1)

4 and 6 are both divisible by 2.

$2(2a - 3)$

(1)

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

$2(5x - 4) = 21$

$10x - 8 = 21$ (1)

isolate x terms on one side

$10x = 29$ (1)

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

$= 2.9$ (1)

$x =$ 2.9

(3)

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

$4e^2f \times 5ef^3$

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

separate products into individual terms

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

$20e^3f^4$

(2)

(Total for Question 17 is 7 marks)

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18 Change 1 m^2 into cm^2

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

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

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

$\times 100$ (m → cm) $\div 100$

$\times 100^2$ (m^2 → cm^2) $\div 100^2$

$10\,000$ cm^2

(Total for Question 18 is 1 mark)

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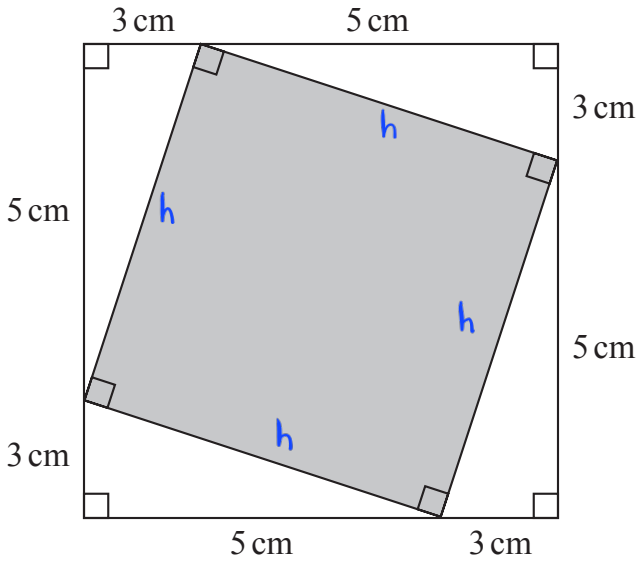
19 This diagram shows two squares.



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

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

Work out Pythagoras to find length h

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

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

$h^2 = 34$

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

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

Area of shaded region :

$A = h \times h$

$= \sqrt{34} \times \sqrt{34}$

$= 34 \text{ cm}^2$ (1)

(1)

34 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)

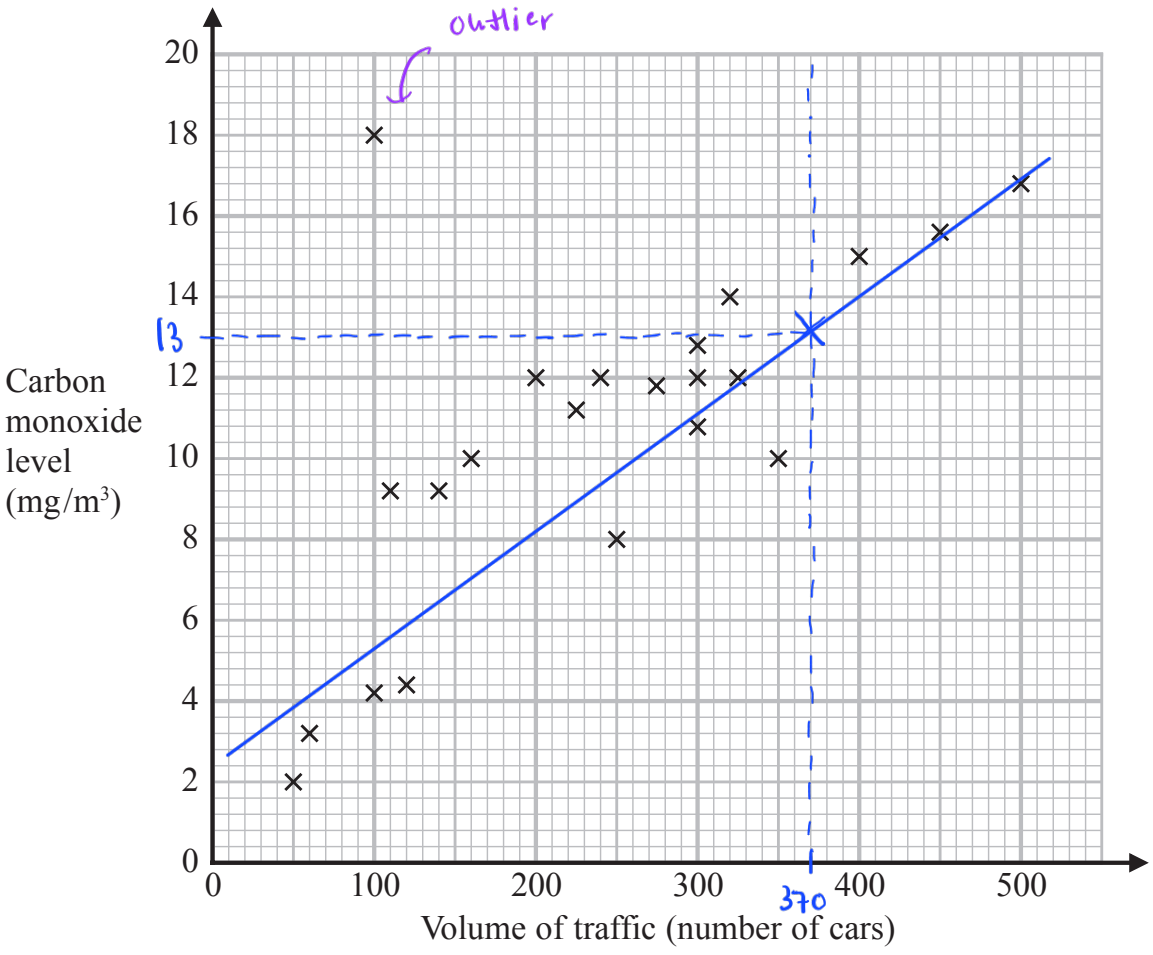
Correct unit stated

Key: 1 | 5 = 15 cm

(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.



(1)

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 $x = 370$.

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

(1)

13 mg/m³

(2)

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)

22 Natalie makes potato cakes in a restaurant.

She mixes potato, cheese and onion so that

weight of potato : weight of cheese : 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.

Total ratio = 9 + 2 + 1 = 12 (1)

Amount of cheese needed for 6000 g of cakes.

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

For 6000 g of cake = $\frac{1}{6} \times 6000\ g$

= 1000 g of cheese

Cost of cheese to make 6000 g of cakes

175 g = £ 2.25

1000 g = x

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

$= 5.71 \times £2.25$ (1)

$= 12.86$ (1)

£ 12.86

(Total for Question 22 is 4 marks)

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

4.5×10^5 → shift the decimal point 5 times to the right

= 450 000 (1)

450 000

(1)

(b) Write 0.007 in standard form.

1 2 3

7×10^{-3} (1)

(1)

(c) Work out $4.2 \times 10^3 + 5.3 \times 10^2$
Give your answer in standard form.

$4.2 \times 10^3 + 5.3 \times 10^2$

(1) use same power, in this case, 10^2 for ease of calculation

$= 42 \times 10^2 + 5.3 \times 10^2$

$= 47.3 \times 10^2$ (1)

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

4.73×10^3

(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

Company A = 1 minute 40 second ÷ 8 litres

$= \frac{5}{24}$ minute per litre

Company B : 1 minute ÷ (2.2 × 4.54 ℓ)

$= \frac{250}{2497}$ minute per litre (1)

Time taken to fill the tank

Company A : $\frac{5}{24}$ minute per litre × 2400 litre

= 500 minutes (1)

Company B : $\frac{250}{2497}$ minute per litre × 2400 litre

= 240.28 minutes (1)

260 minutes

(Total for Question 24 is 4 marks)

Company A - Company B

= 500 - 240.28

= 259.71 minute (1)

≈ 260 minute

25 The first four terms of a Fibonacci sequence are

$a \qquad 2a \qquad 3a \qquad 5a$

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

Work out the value of a.

5th term = 3rd term + 4th term

$= 3a + 5a$

$= 8a$ (1)

$S_5 = a + 2a + 3a + 5a + 8a$

$= 19a$ (1)

$19a = 228$

$a = 12$ (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.

$P(G) = 0.2 + P(P)$ — (1)

$P(G) + P(P) = 1 - (0.05 + 0.15)$ — (2)

$= 0.8$ (1)

(1) into (2)

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

$P(P) = 0.3$, so $P(G) = 0.5$ (1)

(2)

There are 18 blue counters in the bag.

(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

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

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

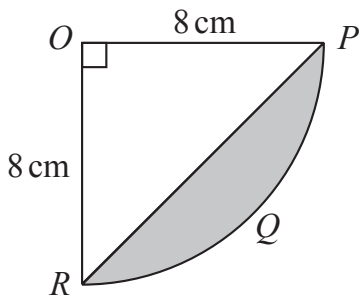
$= 120$ (1)

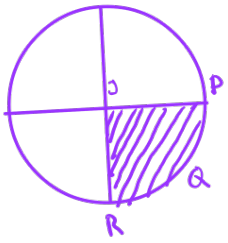
120

(2)

(Total for Question 26 is 4 marks)

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.

(1)

Area of circle OPQR = $0.25 \times \pi \times 8^2$

$= 16\pi \text{ cm}^2$ (1)

Area of triangle OPR = $\frac{1}{2} \times 8 \times 8$

$= 32 \text{ cm}^2$ (1)

Area of shaded region = Area of circle OPQR − Area of triangle OPR

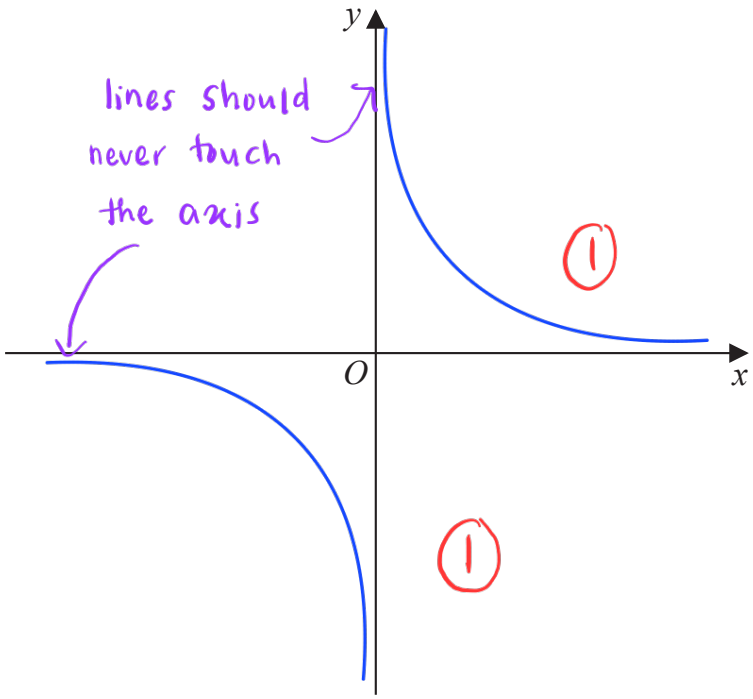
$= 16\pi - 32$

$= 18.3 \text{ cm}^2$ (1)

18.3 ..... cm^2

(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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