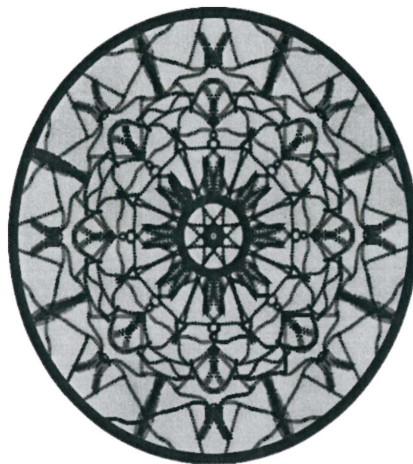


Answers



GCSE Mathematics
2019 Predicted Paper 1 (Non-Calculator)
1MA1
Foundation Tier (1hr 40mins)

Remember: *These questions are just a guide. There are no guarantees that these questions/topics will come up! So, revise all you can before the calculator exams!*

Instructions

- Use **black** ink or ball-point pen.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need*
- You must show all your working
- **Calculators may be used**
- Diagrams are **NOT** accurately drawn, unless otherwise indicated

Information

- The total mark for this paper is **110**.
- 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.
- Keep an eye on time.
- Try to answer every question.

Check your answers if you have time at the end.

1. Mr Jones gave four of his students a test.

The total number of marks for the test is 80

Jamie got $\frac{1}{2}$ of the marks. 40 0.5

Andy got $\frac{2}{5}$ of the marks. 32 0.4

Robbie got $\frac{3}{4}$ of the marks. 60 0.75

Davy got $\frac{3}{5}$ of the marks. 48 0.6

Write the fractions in order of size.

Start with the smallest fraction.

$\frac{2}{5}, \frac{1}{2}, \frac{3}{5}, \frac{3}{4}$

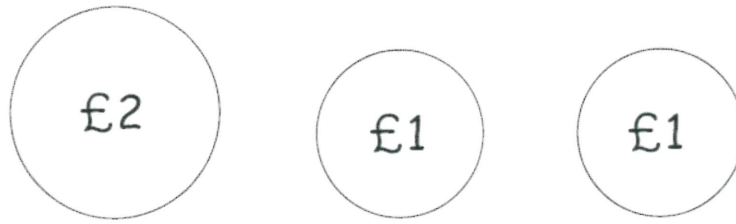
(Total 3 mark)

2. An ice cream van has this price list.

Price List	
Choc Ice	£1.25
Tub	£1.15
Cone	85p

Mitch only has these three coins.

He has no other money.



Mitch wants to buy a choc ice, a tub and 2 cones.

Has Mitch got enough money?

You must show your working.

$$2 \times \text{cones} = 2 \times £0.85 = £1.70$$

$$£1.70 + £1.25 + £1.15 = £4.10$$

$$\begin{array}{r} 1.15 \\ + 1.25 \\ + 1.70 \\ \hline 4.10 \end{array}$$

$$£2 + £1 + £1 = £4.$$

Mitch doesn't have enough money.

(Total 3 marks)

3 Here is a list of 10 numbers.

1 3 3 5 5 7 8 8 8 12

(a) Work out the range.

$$12 - 1 = 11$$

..... 11
(1)

(b) Find the mode.

..... 8
(1)

One of the 10 numbers is picked at random.

(c) Write down the probability that this number is 7

..... $\frac{1}{10}$
.....

(1)

(Total for Question 3 is 3 marks)

4 Change 7500 grams into kilograms.

7.5 kilograms

(Total for Question 4 is 1 mark)

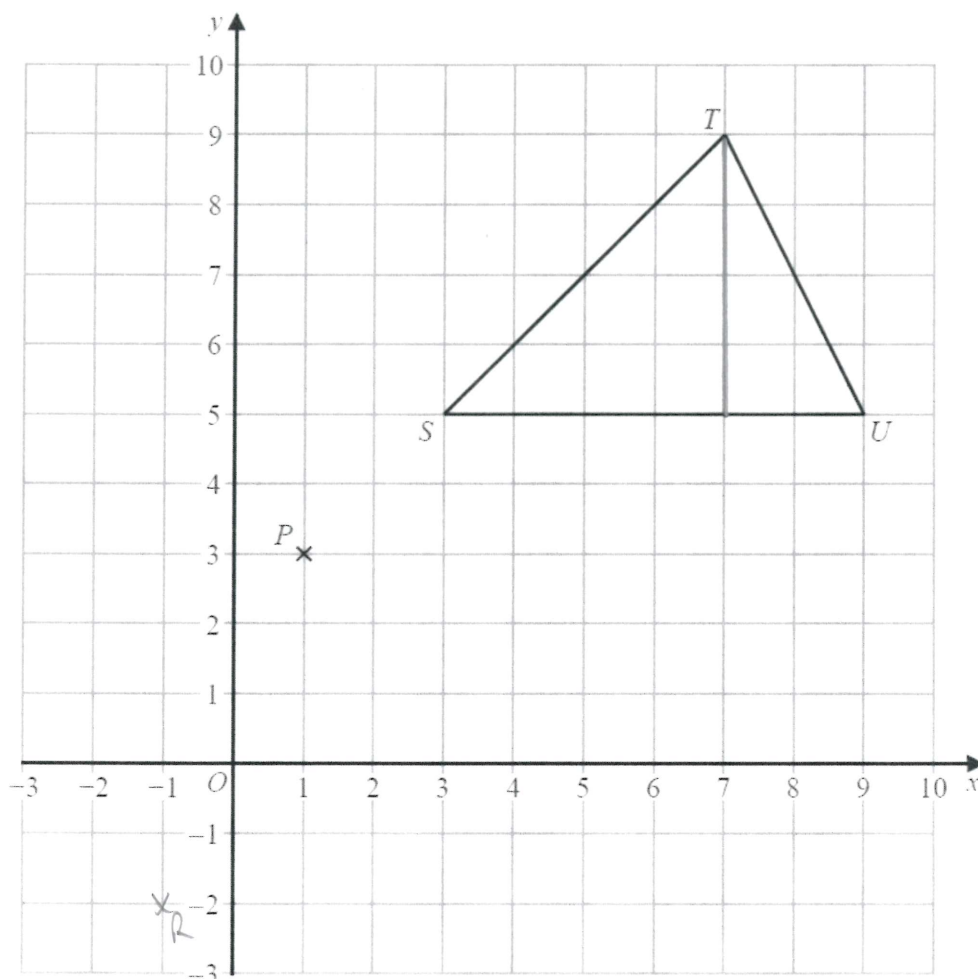
5 Write $\frac{6}{15}$ as a fraction in its simplest form.

$\frac{3}{5}$

$\frac{3}{5}$

(Total for Question 5 is 1 mark)

6 Here is a centimetre grid.



(a) Write down the coordinates of the point P .

(.....1.....,3.....)
(1)

(b) Plot the point with coordinates $(-1, -2)$
Label this point R .

(1)

(c) Find the area of triangle *STU*.

$$\frac{4 \times 4}{2} = 8$$

$$\frac{4 \times 2}{2} = 4$$

$$8 + 4 = 12$$

..... 12 cm²
(2)

(Total for Question 6 is 4 marks)

7 Polly has a full 5 kg sack of rice.

She pours the riced from this sack into bags.

She fills as many bags as possible.

Each full bag contains 350 g of rice.

(a) 1 kg = 1000 g

Convert 5 kg to grams.

..... 5000 grams
(1)

(b) Use your answer to part (a) to help you work out how many bags Polly filled from this bag of rice.

$$\frac{5000}{350} = \frac{500}{35} =$$

$$35 \overline{) 500} \begin{array}{r} 14 \cdot 2 \\ 35 \\ \hline 150 \\ 100 \\ \hline 50 \\ 35 \\ \hline 15 \end{array}$$

..... 14
(2)

Polly assumes that the rice from two sacks will fill twice as many bags as the rice from one sack.

(c) Is Polly correct?

You must give a reason for your answer.

Use these questions to help you:

• How many grams of rice do two sacks contain?

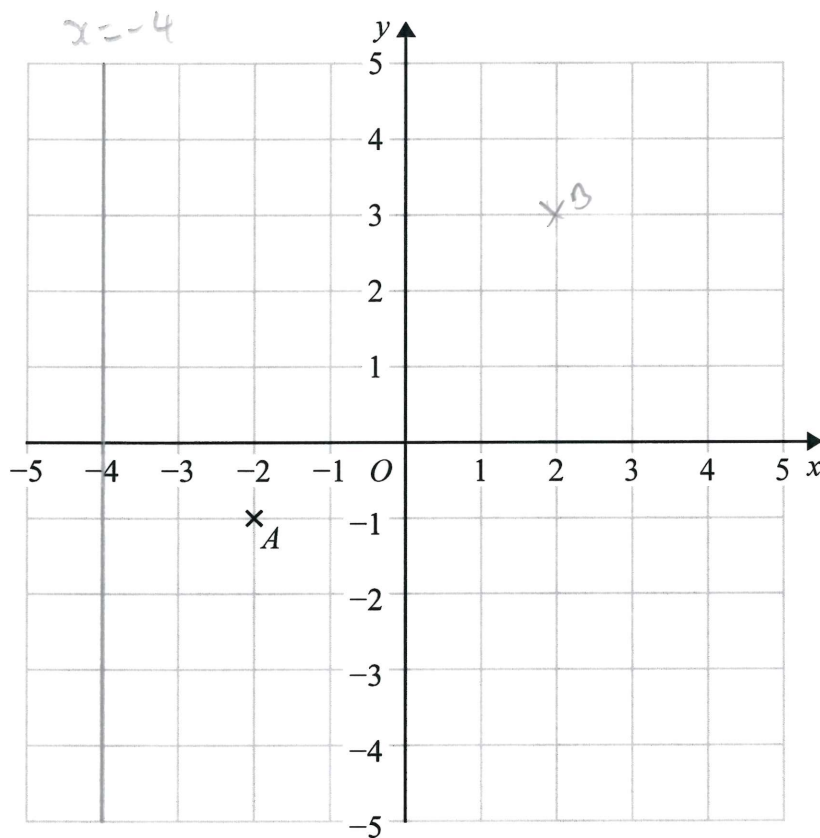
$$\frac{10000}{350} = 28 \text{ remainder}$$

• How many bags could Polly fill from two sacks of rice?

2 sacks contain 10kg of rice. Two sacks of rice will fill 28 bags. 1 sack of rice contains 5kg and will fill 14 bags. \therefore She is right. (1)

(Total for Question 7 is 4 marks)

8



(a) Write down the coordinates of point A.

(..... -2 , -1) (1)

(b) On the grid, mark with a cross (×) the point (2, 3) Label this point B.

(1)

(c) On the grid, draw the line with equation $x = -4$

(1)

(Total for Question 8 is 3 marks)

9 Claire buys a new car for £5700.

She pays a deposit of 12%

(a) Multiply £5700 by 0.12 to work out the value of the deposit Claire pays.

$$5700 \times 0.12 = 684$$

$$\begin{array}{r} 5700 \\ \times 12 \\ \hline 11400 \\ + 57000 \\ \hline 68400 \end{array}$$

£684

(1)

Claire then pays the rest of the cost in 15 equal monthly payments.

(b) Use your answer part (a) to work out how much Claire has left to pay in total.

$$\begin{array}{r} 5700 \\ - 684 \\ \hline 5016 \end{array}$$

5016

(c) Use your answer to part (b) to help you work out the value of each of Claire's monthly payments.

$$15 \overline{) 5016.60} \begin{array}{l} 0334.4 \\ \hline \end{array}$$

£ 334.40

(2)

(Total for Question 9 is 3 marks)

10. (a) Write 0.00385 in standard form.

$$\underline{3.85 \times 10^{-3}}$$

(1)

(b) Write 7.291×10^5 as an ordinary number.

$$\underline{729100}$$

(1)

(c) Work out $(2.4 \times 10^{10}) \div (6 \times 10^{-2})$
Give your answer in standard form.

$$\frac{2.4}{6} = 0.4$$

$$10^{10} \div 10^{-2} = 10^{12}$$

$$0.4 \times 10^{12}$$

$$4 \times 10^{11}$$

$$\underline{4 \times 10^{11}}$$

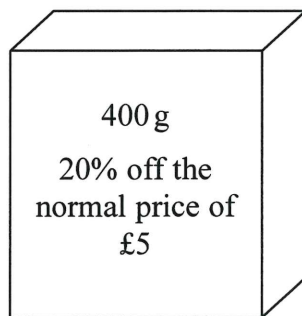
(2)

(Total for Question 10 4 marks)

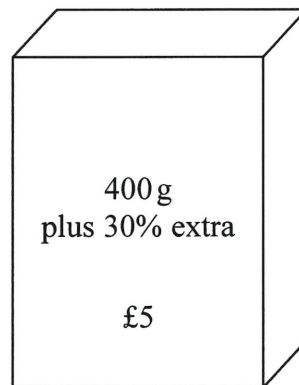
11 Food Mart and Jan's Store sell boxes of the same type of breakfast cereal.

Each shop has a special offer.

Food Mart



Jan's Store



$$\begin{array}{r} 104 \\ 5 \overline{)520} \end{array}$$

Which box of cereal is the better value for money?
You must show your working.

$$10\% \text{ of } \pounds 5 = \pounds 50\text{p}$$

$$20\% = \pounds 1.$$

Food Mart: 400g for $\pounds 4.$
100g for $\pounds 1.$

@CChristian pg. 8

$$10\% = 40$$

$$30\% = 120$$

$$400 + 120 = 520.$$

Jan's store: 520g for $\pounds 5.$
104g for $\pounds 1.$

Jan's store is better.

(Total for Question 11 is 4 marks)

- 12 A farmer has 20 boxes of eggs.
There are 6 eggs in each box.

Write, as a ratio, the number of eggs in two boxes to the total number of eggs.
Give your answer in its simplest form.

$$\begin{array}{l} 40:20 \\ 1:3 \end{array}$$

.....
1:3

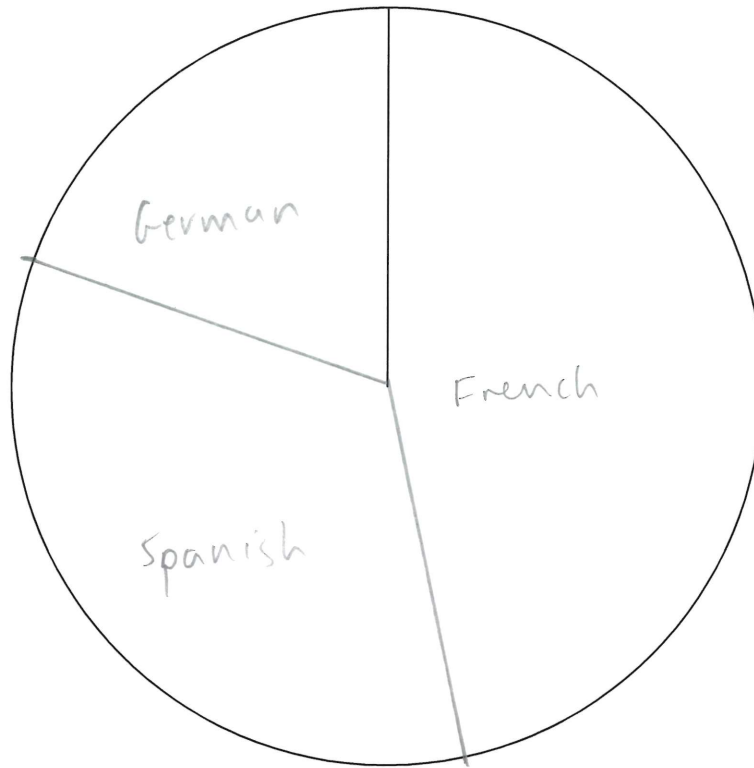
(Total for Question 12 is 2 marks)

- 13 Year 9 students from Halle School were asked to choose one language to study.
The table shows information about their choices.

Language	Number of students	
French	56	168
Spanish	40	120
German	24	72

- (a) Draw an accurate pie chart to show this information.

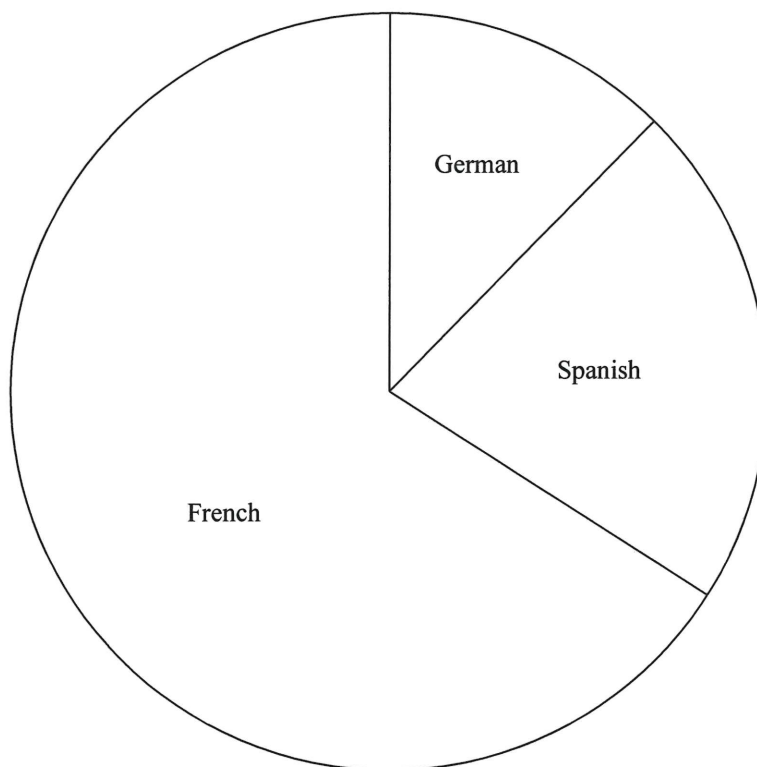
$$\begin{array}{r} 168 \\ + 40 \\ + 24 \\ \hline 232 \end{array}$$



(3)

Year 9 students from Lowry School were also asked to choose one language to study.

This accurate pie chart shows information about their choices.



Shameena says,

“The pie chart shows that French was chosen by more Year 9 students at Lowry School than at Halle School.”

(b) Is Shameena right?

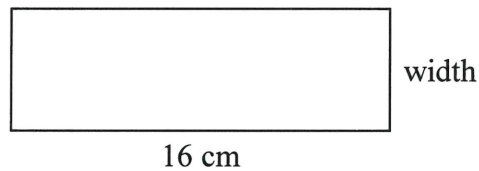
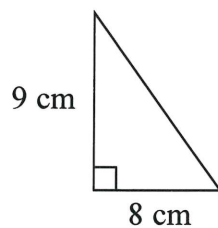
You must explain your answer.

No because the pie charts just show the proportion of students, but we don't know how many students are at each school.

(1)

(Total for Question 13 is 4 marks)

14 Here are a triangle and a rectangle.



$$+6 \times 4 = 24 \text{ of } 24 = 54$$

The area of the rectangle is 6 times the area of the triangle.

Work out the width of the rectangle.

$$\frac{9 \times 8}{2} = \frac{72}{2} = 36$$

$$\begin{array}{r} 3436 \\ \times 6 \\ \hline 216 \end{array}$$

$$\begin{array}{r} 01315 \\ 16 \overline{) 21680} \end{array}$$

$$\cancel{36 \div 6 = 6}$$

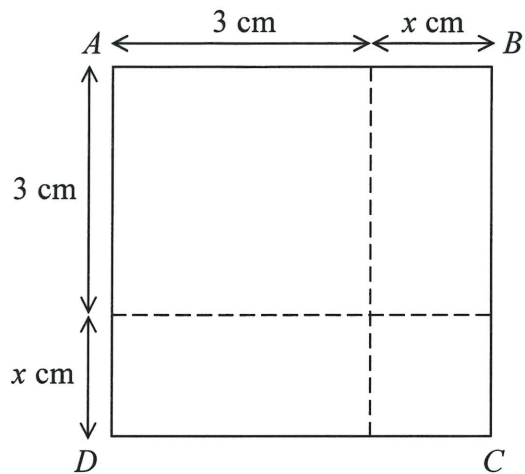
$$36 \times 6 = 216$$

$$216 \div 16 =$$

..... 13.5 cm

(Total for Question 14 is 4 marks)

15



The area of square $ABCD$ is 10 cm^2 .

Show that $x^2 + 6x = 1$

$$3(x+3) = 3x+9$$

$$x(x+3) = x^2 + 3x$$

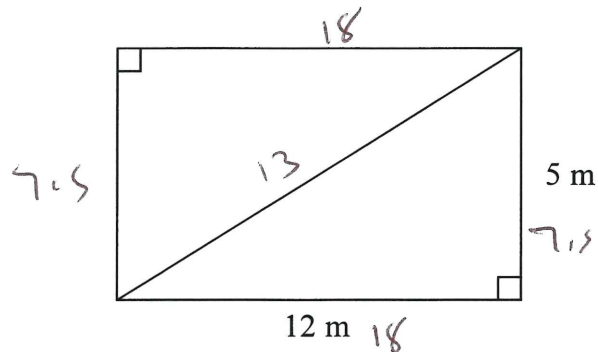
$$x^2 + 3x + 3x + 9 = 10$$

$$x^2 + 6x + 9 = 10$$

$$x^2 + 6x = 1$$

(Total for Question 15 is 3 marks)

16 This rectangular frame is made from 5 straight pieces of metal.



The weight of the metal is 1.5 kg per metre.

Work out the total weight of the metal in the frame.

$$12^2 + 5^2 = 144 + 25 = 169$$

$$\sqrt{169} = 13$$

$$1.5 \times 12 = 18$$

$$1.5 \times 5 = 7.5$$

$$1.5 \times 13 = 13 + 6.5 = 19.5$$

$$15 + 36 + 19.5$$

=

$$\begin{array}{r} 436 \\ + 15 \\ \hline 51 \end{array}$$

$$\begin{array}{r} 451.0 \\ + 19.5 \\ \hline 70.5 \end{array}$$

70.5

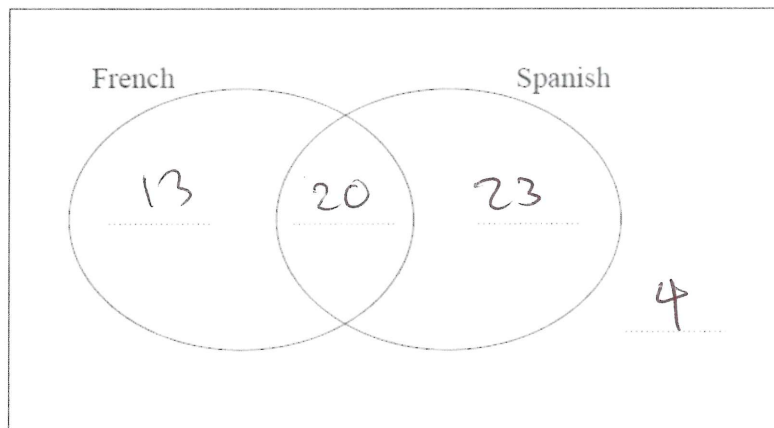
..... kg

(Total for Question 16 is 5 marks)

17. There are 60 students at a college.

- 20 students study both French and Spanish.
- 13 students study French but not Spanish.
- A total of 43 students study Spanish.

(a) Complete the Venn diagram for this information.



$$\begin{array}{r} 43 \\ + 13 \\ \hline 56 \end{array}$$

(3)

One of the students at the college is to be selected at random.

(b) Write down the probability that this student studies neither French nor Spanish.

$$\frac{4}{60}$$

.....

(1)

(Total for Question 17 is 4 marks)

18. There are only blue counters, green counters, red counters and yellow counters in a bag. Olga is going to take at random a counter from the bag.

The table shows the probability that Olga will take a blue counter and the probability

that she will take a yellow counter.

Colour	blue	green	red	yellow
Probability	0.4	$\frac{0.09}{450}x$	$\frac{0.36}{450}$	0.15

The number of red counters in the bag is 4 times the number of green counters in the bag.

Complete the table.

$$0.4 + 0.15 = 0.55$$

$$1 - 0.55 = 0.45$$

$$0.45 = 5x$$

$$x = 0.09$$

(Total for Question 18 is 3 marks)

19. (a) Solve $3(x + 2) = 4$

$$3x + 6 = 4$$

$$3x = -2$$

$$x = -\frac{2}{3}$$

$$x = \dots \frac{-2}{3} \dots \quad (2)$$

(b) Solve $\frac{3x}{2} - 5 = 7$

$$\frac{3x}{2} = 12$$

$$3x = 24$$

$$x = 8$$

$$x = \dots 8 \dots \quad (3)$$

(Total for Question 19 is 5 marks)

20. In the space below, use ruler and compasses to construct the perpendicular bisector of line AB.



(Total for Question 20 is 2 marks)

21. Expand and simplify $(x+2)(x+8)(x-4)$

$$\begin{aligned} & (x^2 + 10x + 16)(x-4) \\ &= x^3 - 4x^2 + 10x^2 - 40x + 16x - 64 \\ &= x^3 + 6x^2 - 24x - 64 \end{aligned}$$

$$\underline{x^3 + 6x^2 - 24x - 64}$$

(Total for Question 21 is 3 marks)

22. Solve the simultaneous equations

$$4x + 2y = 7$$

$$3x - 5y = -24$$

$$\begin{array}{r}
 4x + 2y = 7 \quad (x5) \\
 3x - 5y = -24 \quad (\times 2) \\
 \hline
 20x + 10y = 35 \\
 + 6x - 10y = -48 \\
 \hline
 26x = -13 \\
 x = \frac{-13}{26} = -\frac{1}{2}
 \end{array}$$

$$\begin{array}{r}
 4x + 2y = 7 \\
 4(-\frac{1}{2}) + 2y = 7 \\
 -2 + 2y = 7 \\
 2y = 7 + 2 \\
 2y = 9 \\
 y = \frac{9}{2}
 \end{array}$$

$$x = \dots \frac{-1}{2} \dots$$

$$y = \dots \frac{9}{2} \dots$$

(Total for Question 22 is 4 marks)

23. PQR is an isosceles triangle.

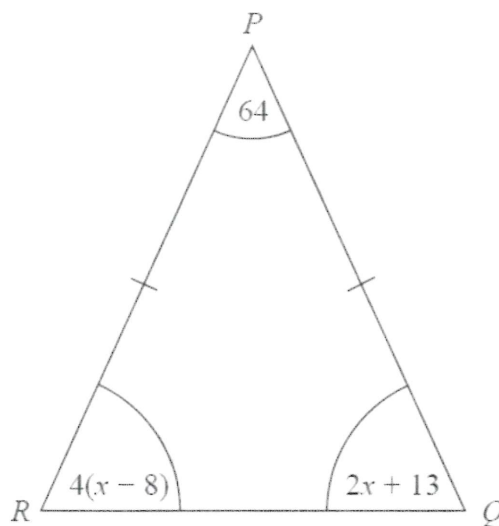


Diagram NOT accurately drawn

$$PQ = PR$$

All the angles are in degrees.

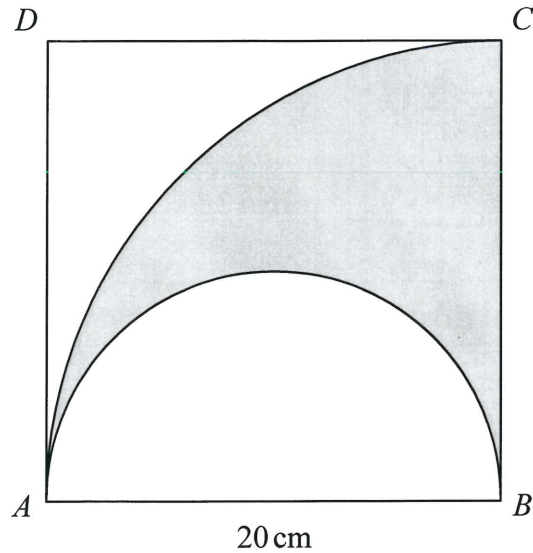
Work out the value of x .

$$\begin{array}{r}
 \cancel{180} \\
 \cancel{64} \\
 4x - 32 = 2x + 13 \\
 4x - 2x = 13 + 32 \\
 2x = 45 \\
 x = 22.5
 \end{array}$$

$$x = \dots 22.5 \dots$$

(Total for Question 23 is 4 marks)

24 The diagram shows a square $ABCD$ with sides of length 20 cm. It also shows a semicircle and an arc of a circle.



AB is the diameter of the semicircle.
 AC is an arc of a circle with centre B .

Show that $\frac{\text{area of shaded region}}{\text{area of square}} = \frac{\pi}{8}$

area of hemisphere =
 $\frac{\pi r^2}{2} = \frac{\pi \times 10^2}{2} = 50\pi$

area of square = $20^2 = 400$

area of sector = $\frac{\theta}{360} \times \pi r^2 = \frac{90}{360} \times \pi \times 20^2$

$100\pi - 50\pi = 50\pi$

$= \frac{1}{4} \times \pi \times 20^2$

$= 100\pi$

$\frac{\text{area of shaded region}}{\text{area of square}} = \frac{50\pi}{400} = \frac{\pi}{8}$

(Total for Question 24 is 4 marks)

- 25 The size of each interior angle of a regular polygon is 11 times the size of each exterior angle.
 Work out how many sides the polygon has.

$$12x = 180$$

$$x = 15$$

$$\frac{180(n-2)}{n} = 165$$

~~$$180n - 360 = 165n$$~~

~~$$180n - 15n = 360$$~~

~~$$165n = 360$$~~

$$12 \overline{) 180} \begin{array}{r} 015 \\ \underline{120} \\ 60 \\ \underline{60} \\ 0 \end{array}$$

$$11 \times 15 = 165$$

$$\frac{180(n-2)}{n} = 165$$

$$180n - 360 = 165n$$

$$15n = 360$$

$$n = 24$$

~~15~~ 24

(Total for Question 25 is 3 marks)

- 26 The equation of the line L_1 is $y = 3x - 2$
The equation of the line L_2 is $3y - 9x + 5 = 0$

Show that these two lines are parallel.

$$m \text{ of } L_1 = 3$$

$$L_2: 3y - 9x + 5 = 0$$

$$3y = 9x - 5$$

$$y = \frac{9}{3}x - \frac{5}{3}$$

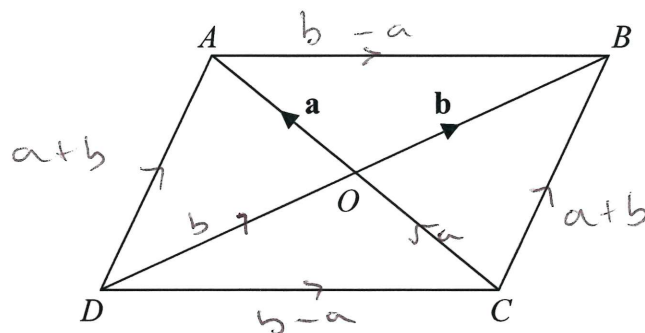
$$y = 3x - \frac{5}{3}$$

$$m \text{ of } L_2 = 3$$

The 2 lines are parallel as they have the same gradient.

(Total for Question 26 is 2 marks)

27



$ABCD$ is a parallelogram.

The diagonals of the parallelogram intersect at O .

$$\vec{OA} = \mathbf{a} \text{ and } \vec{OB} = \mathbf{b}$$

(a) Find, in terms of \mathbf{b} , the vector \vec{DB} .

$$\begin{aligned}\vec{DB} &= \vec{OC} + \vec{CB} \\ &= \mathbf{b} - \mathbf{a} + \mathbf{a} + \mathbf{b} \\ &= 2\mathbf{b}\end{aligned}$$

$$\frac{2\mathbf{b}}{\dots\dots\dots} \quad (1)$$

(b) Find, in terms of \mathbf{a} and \mathbf{b} , the vector \vec{AB} .

$$\frac{\mathbf{b} - \mathbf{a}}{\dots\dots\dots} \quad (1)$$

(c) Find, in terms of \mathbf{a} and \mathbf{b} , the vector \vec{AD} .

$$\frac{-\mathbf{a} - \mathbf{b}}{\dots\dots\dots} \quad (1)$$

(Total for Question 27 is 3 marks)

END OF QUESTIONS

