LJH WS

Langley Park School for Girls
Year 11 Maths Trial Exam March 2021
Foundation Tier
PAPER 2F
CALCULATOR
Time: 1 hour 30 minutes

Name _____

Maths Teacher LJH WS

Instructions

- Use **black** ink or ball-point pen.
- Answer **all** questions.
- Answer the questions in the spaces provided
- **Calculators may be used.**

Information

- There are 29 questions on this paper
- 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.
- Keep an eye on the time.
- Try to answer every question.
- Show all of your working out.
- Check your answers if you have time at the end.

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Write 0.37 as a fraction.

$\frac{37}{100}$

(Total for Question 1 is 1 mark)

2 Write 29 381 correct to the nearest 1000

29000

(Total for Question 2 is 1 mark)

3 Simplify $3e - e + 4e$

$6e$

(Total for Question 3 is 1 mark)

4 Write $\frac{1}{4}$ as a percentage.

25 %

(Total for Question 4 is 1 mark)

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5 Here is a list of numbers.

3 4 9 18 27 30 36

From the numbers in the list, write down a cube number.

27

(Total for Question 5 is 1 mark)

6 Liz is watching a film at the cinema.

The film started at 1430
The film is 105 minutes long. 105 mins = 1 hour, 45 mins

When the film ends, Liz takes 20 minutes to get to the bus stop.

A bus leaves the bus stop at 1645

Does Liz get to the bus stop in time to get this bus?
You must show all your working.

Film ends at 1615

Liz arrives at the bus stop at 1635

The bus leaves at 1645

Yes, Liz will get to the bus stop in time to get the bus. She will have 10 minutes to spare.

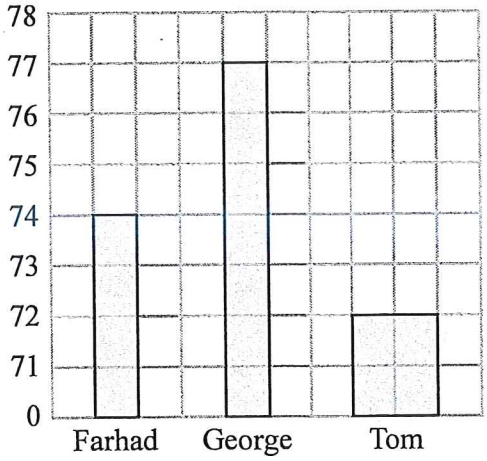
(Total for Question 6 is 3 marks)

7 Farhad, George and Tom each did a test.

Here are their marks for the test.

Farhad	74
George	77
Tom	72

George drew this bar chart to show the marks they got.
The bar chart is **not** fully correct.



Write down **two** things that are wrong with George's bar chart.

1 All bars should be the same width but Tom's bar is wider that the other bars

2 On the vertical axis there is no label. It should be labelled marks

(Total for Question 7 is 2 marks)

Also On vertical axis should be a

to show that numbers have been missed out.

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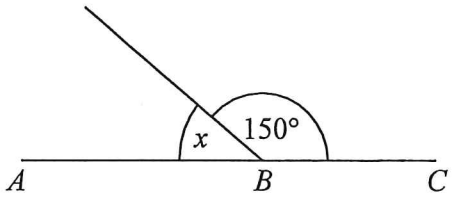
8



ABC is a straight line.

(a) (i) Work out the size of the angle marked *x*.

30 °

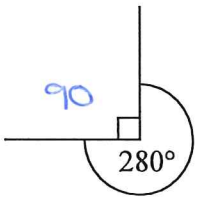
(1)

(ii) Give a reason for your answer.

angles on a straight line add up to 180°

(1)

The diagram below is wrong.



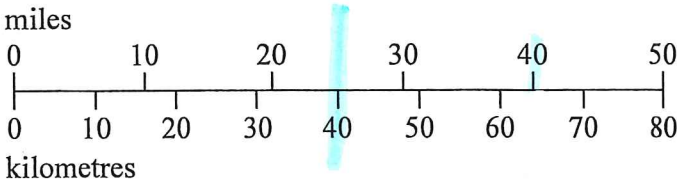
(b) Explain why.

Angles at a point add up to 360°
A right angle is marked which is 90°
360° − 90° = 270°

(1)

(Total for Question 8 is 3 marks)

9 This scale can be used to change between kilometres and miles.



(a) Use the scale to change 40 kilometres to miles.

25 miles

(1)

Here is an approximate rule to change from kilometres to miles.

Divide the distance in kilometres by 10 and then multiply by 6

(b) Use this approximate rule to change 40 kilometres to miles.

$\frac{40}{10} \times 6$

$= 4 \times 6$

$= 24$

24 miles

(2)

(c) Compare your answer to part (b) with your answer to part (a).

the answers are very close

(1)

(Total for Question 9 is 4 marks)

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10 (a) Solve $3m = 36$ [÷ 3

$m = 12$

$m =$ 12

(1)

(b) Solve $7 - x = 3$ [+ x

$7 = 3 + x$ [− 3

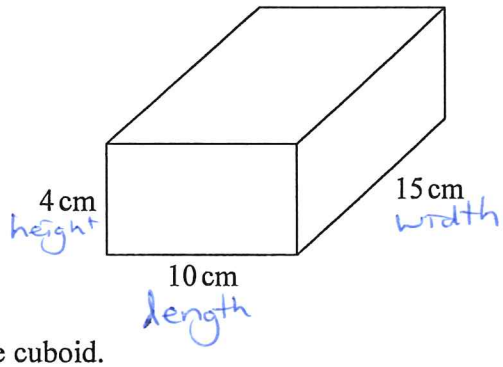
$4 = x$

$x =$ 4

(1)

(Total for Question 10 is 2 marks)

11 Here is a cuboid.



Work out the volume of the cuboid.

Volume = length × width × height

= 10 × 15 × 4

= 600 cm^3

remember units!

600 cm^3

(Total for Question 11 is 3 marks)

12 Lucy uses a code to open a lock.

The code is a letter followed by a 2-digit number.

The letter is L or U.
The number is a prime number between 20 and 30

Write down all the possibilities for Lucy's code.

23, 29

L23 U23

L29 U29

(Total for Question 12 is 2 marks)

13 A machine fills bags with sweets.

There are 4275 sweets.
There are 28 sweets in each full bag.

The machine fills as many bags as possible.

How many sweets are left?

$\frac{4275}{28} = 152.678\ldots$

152 full bags

$152 \times 28 = 4256$ sweets

$4275 - 4256 = 19$ sweets left over

19

(Total for Question 13 is 3 marks)

14 The table gives information about the number of goals scored by each of three teams.

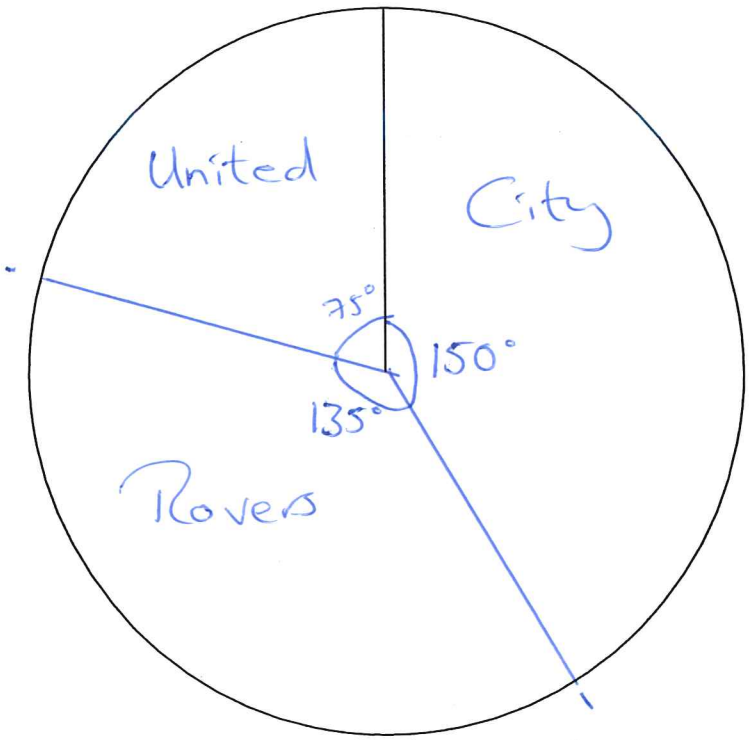
Team	Number of goals
City	50
Rovers	45
United	25

$\times 3^\circ = 150^\circ$
$\times 3^\circ = 135^\circ$
$\times 3^\circ = 75^\circ$

120

Draw an accurate pie chart for this information.

$360^\circ \div 120 = 3^\circ$ per goal



(Total for Question 14 is 3 marks)

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15 $T = 3x + 4y$

(a) Work out the value of T when $x = 5$ and $y = -7$

$T = 3 \times 5 + 4 \times -7$
$= 15 - 28$
$= -13$

-13

(2)

(b) Work out the value of y when $T = 38$ and $x = 6$

$38 = 3 \times 6 + 4y$
$38 = 18 + 4y$ [-18
$20 = 4y$ [$\div 4$
$5 = y$

$y = 5$

(2)

(Total for Question 15 is 4 marks)

16 An exam has two papers, Paper 1 and Paper 2

Paper 1 has 60 marks.
Paper 2 has 90 marks.

The pass mark is $\frac{2}{3}$ of the total number of marks.

Danielle gets 70% of the marks for Paper 1

How many of the marks for Paper 2 must Danielle get in order to get the pass mark?

total marks = 60 + 90
= 150 marks

$\frac{2}{3}$ of 150 = 100 marks

Danielle has 70% of 60 marks = 42 marks

Danielle needs 100 − 42 = 58 marks
on paper 2

58

(Total for Question 16 is 4 marks)

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17 Scott wants to make orange juice.
He is going to buy boxes of oranges.

There are 24 oranges in each box of oranges.
30 oranges make 2 litres of orange juice.

Scott needs to buy enough oranges to make 8 litres of orange juice.

(a) Work out the number of boxes of oranges that Scott needs to buy.
You must show all your working.

30 oranges : 2 litres
×4 ×4
120 oranges : 8 litres

number of boxes needed
$= \frac{120}{24}$
$= 5$ boxes

5 boxes
(3)

Scott also buys
1260 apples
280 bananas

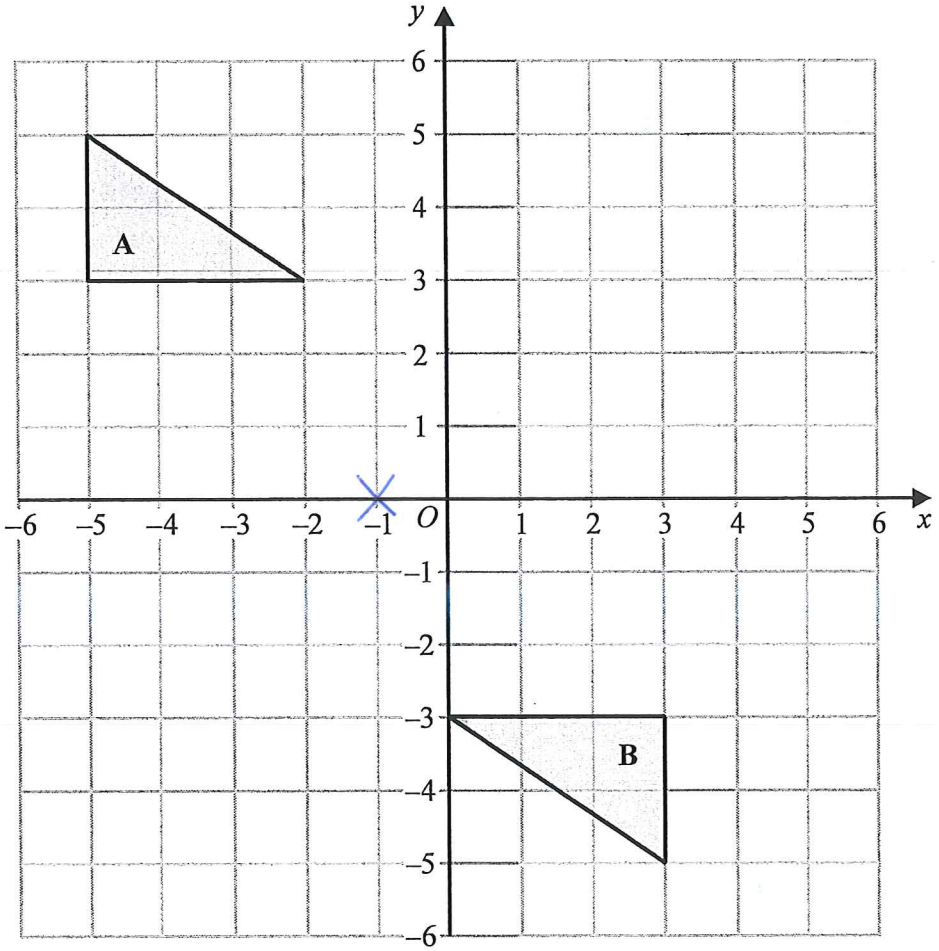
(b) Write down the ratio of the number of apples that Scott buys to the number of bananas that he buys.
Give your ratio in its simplest form.

Apples : Bananas
1260 : 280 ÷10
÷10 126 : 28 ÷2
÷2 63 : 14 ÷7
÷7 9 : 2

9 : 2
(2)

(Total for Question 17 is 5 marks)

18



Describe fully the single transformation that maps triangle **A** onto triangle **B**.

Rotation, 180°, centre (−1, 0)

(Total for Question 18 is 2 marks)

19 Adam, Linda and Rytis share an amount of money.

Linda gets three times as much money as Rytis gets.
Linda gets half as much money as Adam gets.

What fraction of the amount of money does Linda get?

A L R

$2x : x : \frac{x}{3}$

×3 ×3 ×3

$6x : 3x : x$

Linda gets $\frac{3x}{10x} = \frac{3}{10}$

$\frac{3}{10}$

(Total for Question 19 is 2 marks)

20 Pens and pencils are sold in a shop.

12 pencils cost £1.80

x : y

The ratio of the cost of a pen to the cost of a pencil is 7 : 3

Work out the cost of 5 pens.

1 pencil costs £1.80 ÷ 12 = 15p or £0.15

15p ← 15p → ← 15p → ← 15p →

x	x	x	x	x	x	x	y	y	y

pen cost → ← pencil cost →

a pencil costs 15p

a pen costs 35p

5 pens cost 5 × 35p

= 175p

or £1.75

£ 1.75

(Total for Question 20 is 4 marks)

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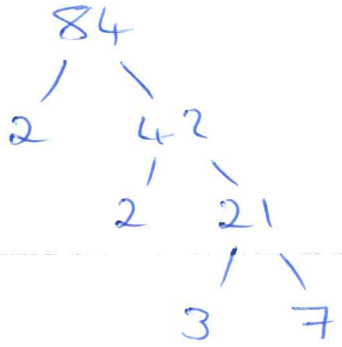
21 (a) Write 84 as a product of its prime factors.

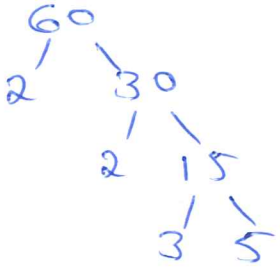


* On calculator
84 =
Shift FACT *

$2^2 \times 3 \times 7$

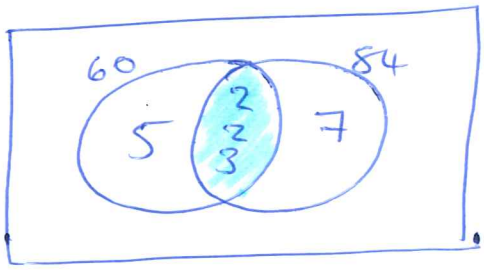
(2)

(b) Find the lowest common multiple (LCM) of 60 and 84



$84 = 2 \times 2 \times 3 \times 7$

$60 = 2 \times 2 \times 3 \times 5$



$LCM = 5 \times 2 \times 2 \times 3 \times 7$

$= 420$

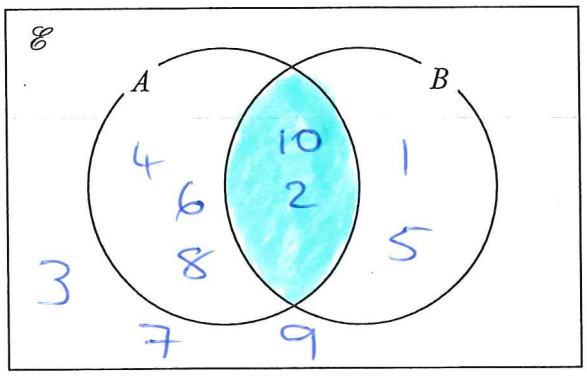
420

(2)

(Total for Question 21 is 4 marks)

22 $\mathscr{E}$ = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}
A = {even numbers} = {2, 4, 6, 8, 10}
B = {factors of 10} = {1, 2, 5, 10}

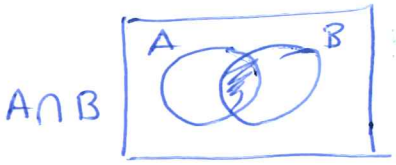
(a) Complete the Venn diagram for this information.



(3)

A number is chosen at random from the universal set, $\mathscr{E}$

(b) Find the probability that this number is in the set $A \cap B$



two numbers in here and ten numbers in total

$P(A \cap B) = \frac{2}{10}$ or $\frac{1}{5}$

(2)

(Total for Question 22 is 5 marks)

23 Carlo puts tins into small boxes and into large boxes.

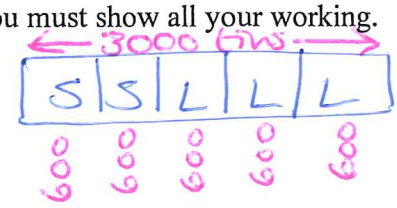
He puts 6 tins into each small box.
He puts 20 tins into each large box.

Carlo puts a total of 3000 tins into the boxes so that

number of tins in small boxes : number of tins in large boxes = 2 : 3

Carlo says that less than 30% of the boxes filled with tins are large boxes.

Is Carlo correct?
You must show all your working.



$3000 \div 5 = 600$

number of tins in small boxes $= 2 \times 600$
$= 1200$

number of tins in large boxes $= 3 \times 600$
$= 1800$

number of small boxes needed (each with 6 tins in) $= \frac{1200}{6} =$ 200 small boxes

number of large boxes needed (each with 20 tins in) $= \frac{1800}{20} =$ 90 large boxes

total boxes $= 200 + 90$
$= 290$ boxes

Small boxes

$\frac{200}{290} \times 100$

$= 68.9655\ldots$

$\approx 69\%$

Large boxes

$\frac{90}{290} \times 100$

$= 31.0344\ldots$

$\approx 31\%$

Carlo is NOT correct as 31% of the boxes filled with tins are large boxes

(Total for Question 23 is 5 marks)

24 (a) Complete the table of values for $y = 5 - x^3$

On calc

option 1
$5-(-2)^3=$
use brackets around -2

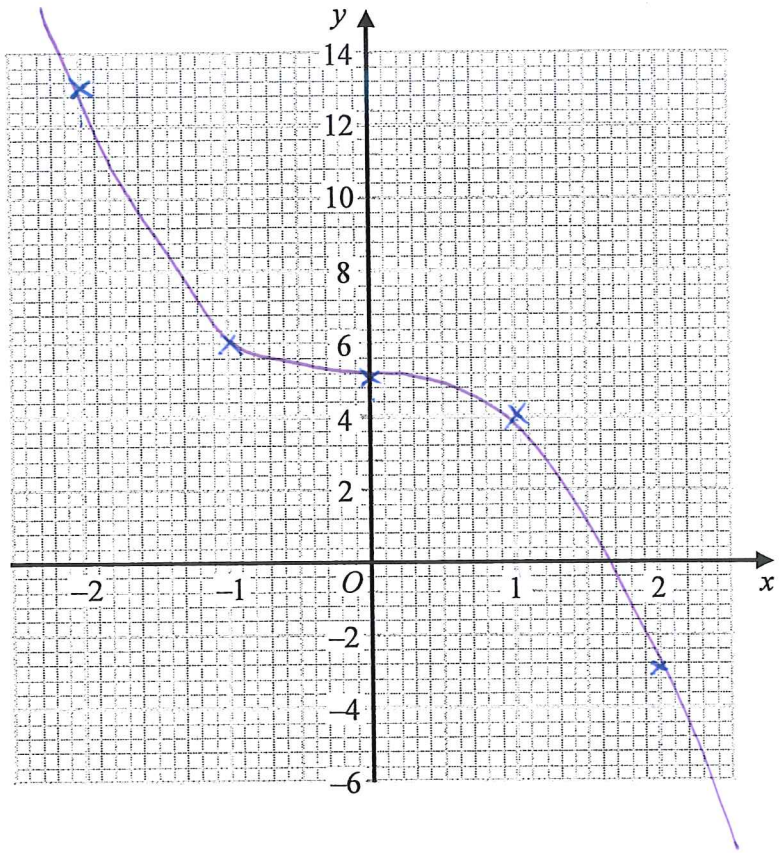
option 2
$-2 =$
$5-ANS^2$

option 3
mode 3: TABLE
$f(x)=5-x^3$
↑ use ALPHA X
Start -2
End 2
Step 1

x	–2	–1	0	1	2
y	13	6	5	4	–3

(2)

(b) On the grid below, draw the graph of $y = 5 - x^3$ for values of x from –2 to 2



(2)

(Total for Question 24 is 4 marks)

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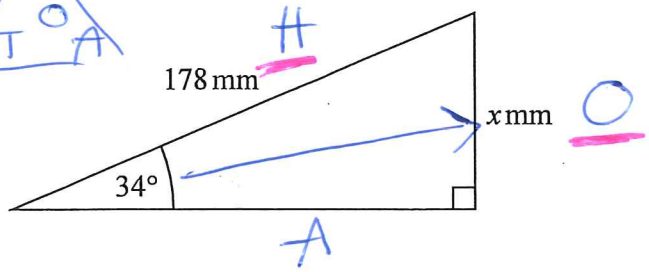
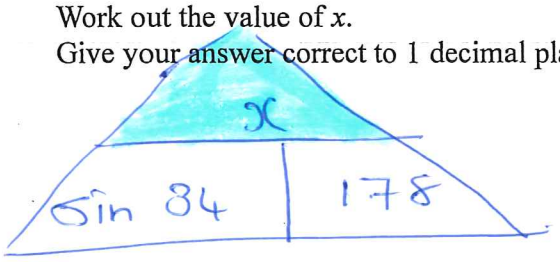
25

SOH CAH TOA



H O A

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



$x = \sin(34) \times 178$
$= 99.53633\ldots$
$= 99.5\text{mm}$ (1dp)

Units !

99.5 mm

(Total for Question 25 is 2 marks)

26 $\mathbf{a} = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} 5 \\ -2 \end{pmatrix}$

Find $2\mathbf{a} - 3\mathbf{b}$ as a column vector.

$2\begin{pmatrix} 3 \\ 4 \end{pmatrix} - 3\begin{pmatrix} 5 \\ -2 \end{pmatrix}$

$= \begin{pmatrix} 6 \\ 8 \end{pmatrix} - \begin{pmatrix} 15 \\ -6 \end{pmatrix}$

$= \begin{pmatrix} 6 - 15 \\ 8 - -6 \end{pmatrix}$

$= \begin{pmatrix} -9 \\ 14 \end{pmatrix}$

$\begin{pmatrix} -9 \\ 14 \end{pmatrix}$

(Total for Question 26 is 2 marks)

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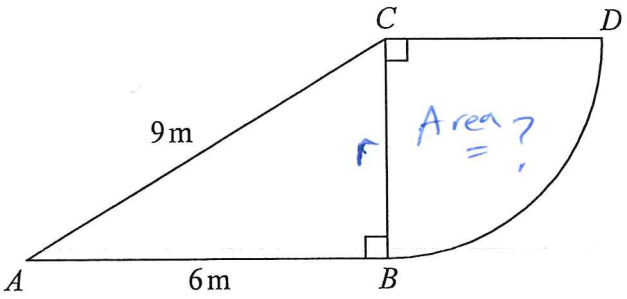
27 The diagram shows a right-angled triangle and a quarter circle.

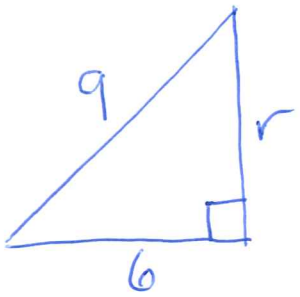


The right-angled triangle ABC has angle $ABC = 90°$
The quarter circle has centre C and radius CB.

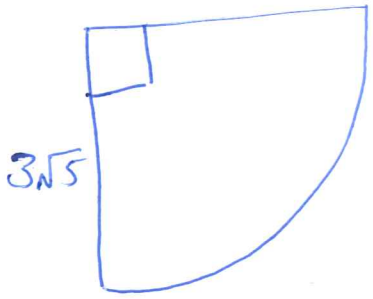
Work out the area of the quarter circle.
Give your answer correct to 3 significant figures.
You must show all your working.

Area quarter circle $= \frac{\pi r^2}{4}$

Use pythagoras' theorem to find the radius



$r^2 + 6^2 = 9^2$
$r^2 = 9^2 - 6^2$
$r^2 = 45$
$r = \sqrt{45}$
$r = 3\sqrt{5}$



Area $= \frac{\pi (3\sqrt{5})^2}{4}$

$= 35.34291....$
$= 35.3 \text{ (3sf) } m^2$

35.3 m²

(Total for Question 27 is 4 marks)

28 Each exterior angle of a regular polygon is 15°

Work out the number of sides of the polygon.

sum of exterior angles of any polygon
$= 360°$

number sides $= \frac{360°}{15°}$

24 sides

(Total for Question 28 is 2 marks)

29 Write down the gradient of the line with equation $y = 2x + 3$

2

(Total for Question 29 is 1 mark)

TOTAL FOR PAPER IS 80 MARKS