AQA **model solutions**

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

GCSE MATHEMATICS

F

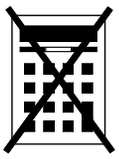
Foundation Tier Paper 1 Non-Calculator

Tuesday 21 May 2019 Morning Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:
- mathematical instruments

You must **not** use a calculator.



Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

Advice

In all calculations, show clearly how you work out your answer.

For Examiner's Use	
Pages	Mark
2–3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16–17	
18–19	
20–21	
22–23	
24–25	
26	
TOTAL	

Answer **all** questions in the spaces provided

Do not write outside the box

1 Which type of angle is the largest?

Circle your answer.

[1 mark]

right | reflex | obtuse | acute

angle bigger than 180°

2 Solve $4x = 8$

Circle your answer.

$4x = 8$ ÷4 ÷4 $x = 2$

[1 mark]

$x = 0.5$ | $x = 2$ | $x = 4$ | $x = 32$

3 Work out $10 + (-4)$

Circle your answer.

$= 10 - 4$
$= 6$

[1 mark]

–14 | –6 | 6 | 14

Do not write outside the box

4 Circle the calculation which works out half of 12

[1 mark]

$12 \div 0.5$ $\quad \frac{12}{1} \div \frac{1}{2} = 24$

$2 \div 12$ $\quad = \frac{1}{6}$

$12 \times \frac{1}{2}$ $\quad = 6$

$12 \div 50 \times 100$ $\quad 24$

5 (a) Work out $364.5 + 17.9 - 2.08$

only addition and subtraction so order does not matter

[2 marks]

$$\begin{array}{r} 364.5 \\ +\ 17.9 \\ \hline 382.4 \end{array} \qquad \begin{array}{r} 382.40 \\ -\ 2.08 \\ \hline 380.32 \end{array}$$

Answer 380.32

5 (b) Work out 9.36×2

[1 mark]

$$\begin{array}{r} 9.36 \\ \times\ \ 2 \\ \hline 18.72 \end{array}$$

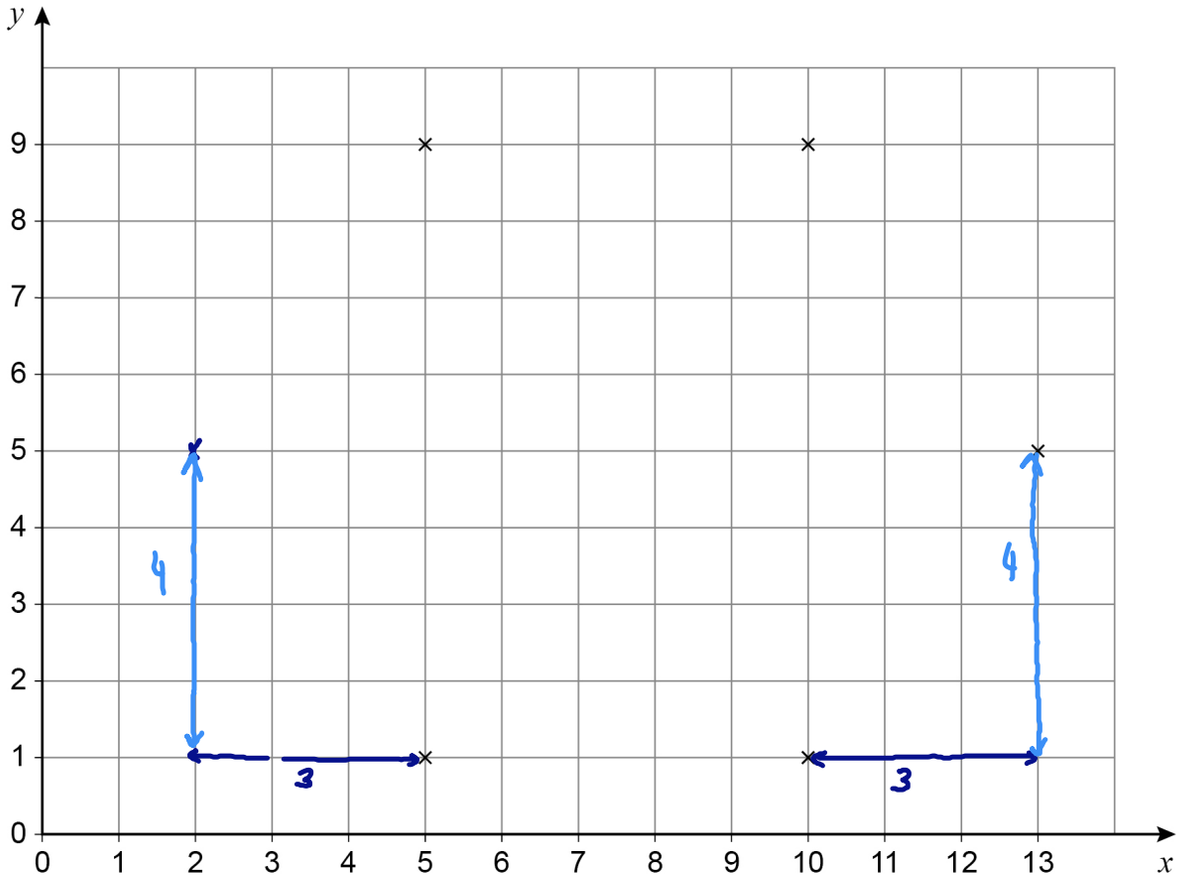
Answer 18.72

7

Turn over ▶

Do not write outside the box

6 Five points are plotted on a centimetre grid.



The points are five of the vertices of a hexagon.

Each side of the hexagon has the same length.

Work out **one** possible pair of coordinates of the other vertex.

[2 marks]

Answer (2 , 5)

Do not write outside the box

7 Amy and Brad each have some money.

Carly has no money.

Amy gives £7 to Carly.

Brad gives £5 to Carly.

Now they all have the same amount of money.

How much money did Amy have to begin with?

[2 marks]

at the end, Carl has £12
(£7 from A
£5 from B)

so, Amy also has £12 at the end.

∴ at the start, Amy had 12+7 = £19

Answer £ 19

Turn over for the next question

4

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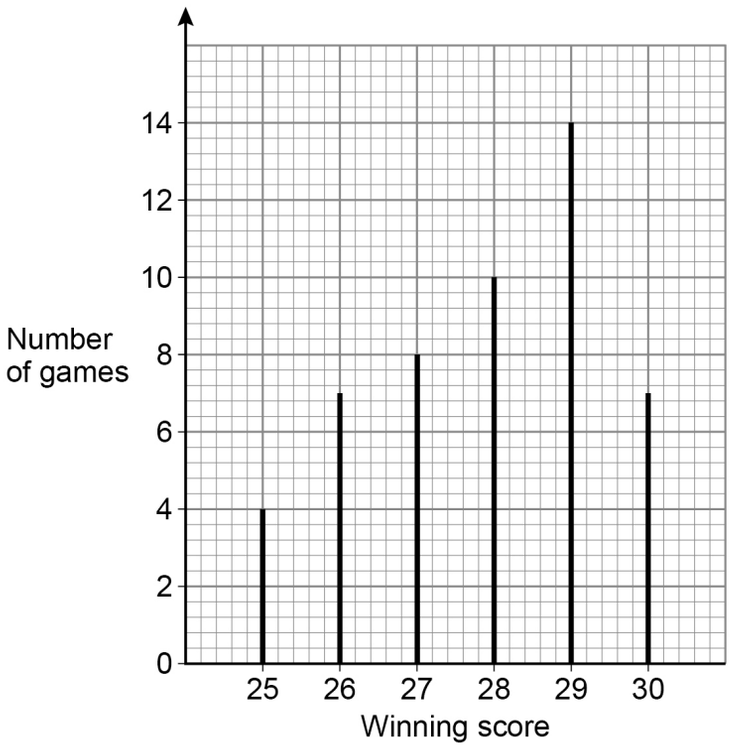
8 A game is played 50 times.

The vertical line chart shows the winning scores.



8 (a) Write down the mode.

= the tallest bar

[1 mark]

Answer 29

Do not write outside the box

The game is played again.

8 (b) Use the chart to estimate the probability that the winning score is 25 **[1 mark]**

no. when 25 is scored

Answer $\frac{4}{50}$

total no. games

8 (c) Use the chart to estimate the probability that the winning score is 27 or more. **[2 marks]**

27 or more: 8+10+14+7 = 39

Answer 39/50

9 (a) Write down **all** the factors of 18 **[2 marks]**

Answer 1, 2, 3, 6, 9, 18

1 x 18 = 18
2 x 9 = 18
6 x 3 = 18

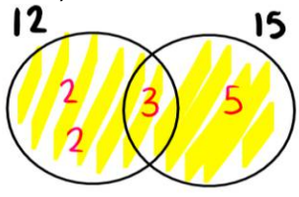
9 (b) Work out the lowest common multiple (LCM) of 12 and 15 **[2 marks]**

12 = 2 x 2 x 3

2 6
3 2

15 = 3 x 5

3 5



LCM = 2 x 2 x 3 x 5
= 60

Answer 60

8

Do not write outside the box

10 Coaches take people to a festival.

Each coach can take 50 people.

10 (a) From one city there are 820 people.

How many coaches are needed?

$\frac{820}{50} = \frac{82}{5}$

$5\overline{)82^{2}\cdot0^{3}}$ = 16.4

therefore need 17 buses as 16 is not enough for everyone

Answer 17

Do not write outside the box

10 (b) From a different city 13 coaches are needed.

Each coach costs £450 to hire.

Work out the total cost of hiring 13 coaches.

[3 marks]

13 x £450 = ?

10 coaches = £4500

3 coaches = + £1350

£5850

+1

450
x 3
1350

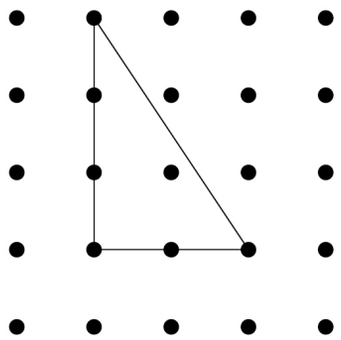
Answer £ 5850

Turn over for the next question

6

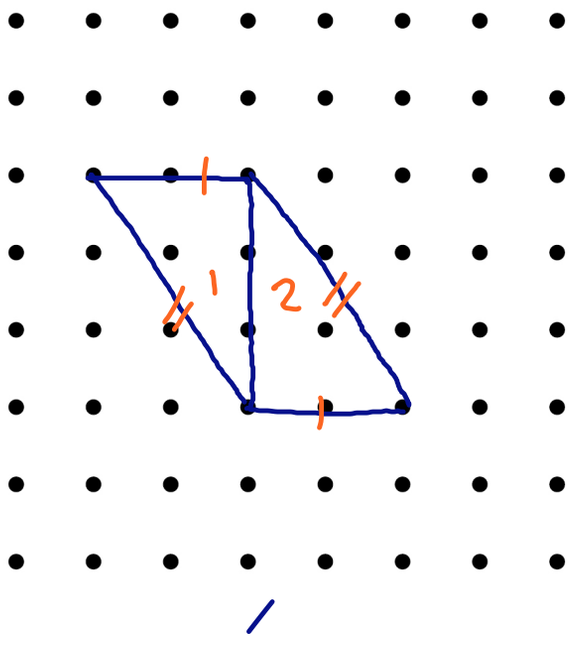
Do not write outside the box

11 Here is a triangle on a square dotty grid.



11 (a) On the grid below, show how you can make a parallelogram with **two** of these triangles.

[1 mark]



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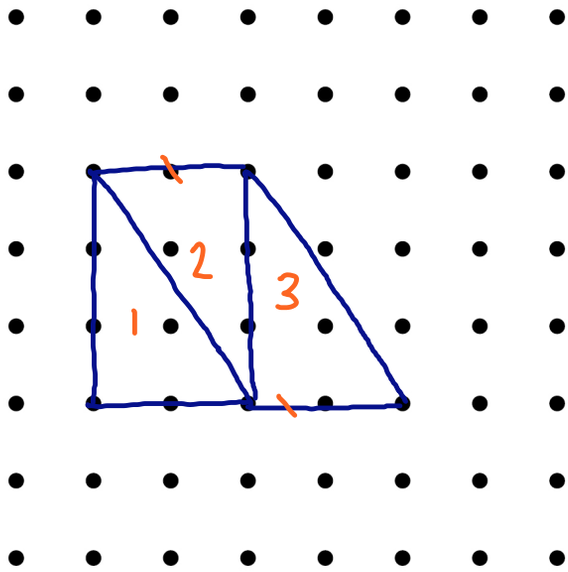
11 (b) On the grid below, show how you can make a trapezium with **three** of these triangles.

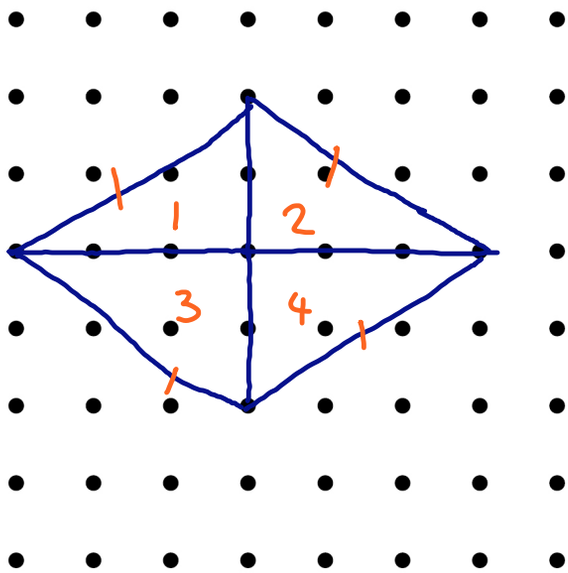
[1 mark]



11 (c) On the grid below, show how you can make a rhombus with **four** of these triangles.

[1 mark]

all sides the same length



3

Turn over ►

Do not write outside the box

12 Work out 65% of 300

[3 marks]

10% of 300 = 30 (0.1 x 300)

∴ 60% of 300 = 180 10% x 6 = 30 x 6 = 180

5% of 300 = + 15 *half of 10%

195

Answer 195

13 In a game the average score was 50

Tom's score was $\frac{5}{2}$ of the average.

½ of 50 = 25

5/2 = 25 x 5 = 125

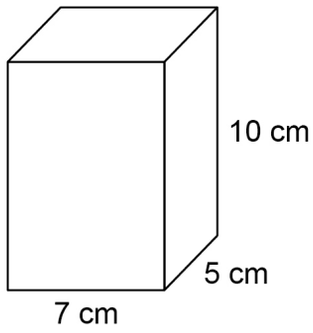
Circle Tom's score.

[1 mark]

(125) 175 30 20

Do not write outside the box

14 Here is a cuboid.



Work out the volume.

[2 marks]

Volume = depth × width × height

= 10 × 7 × 5

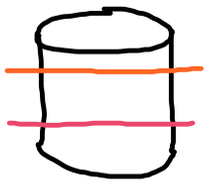
= 350cm^3

Answer 350 cm^3

15 Circle the shape that has a uniform cross section.

[1 mark]

cone sphere (cylinder) pyramid

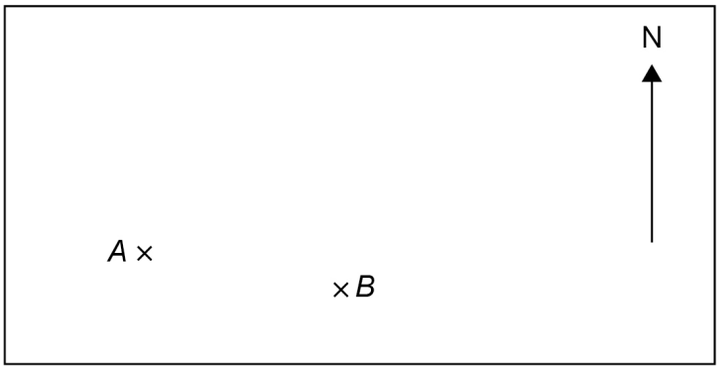


Wherever you cut the cylinder, the crossection is a circle

7

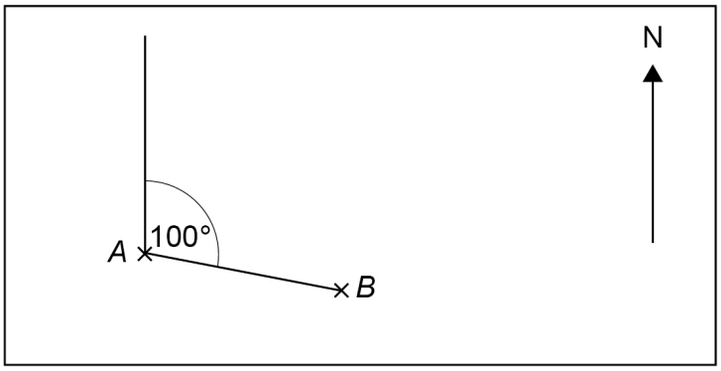
Do not write outside the box

16 (a) Here is a map showing points *A* and *B*.



Kemal wants to measure the bearing of ***A* from *B***.

He draws two lines and measures the angle between them.



Kemal says that the bearing of *A* from *B* is 100°

Is his method correct?

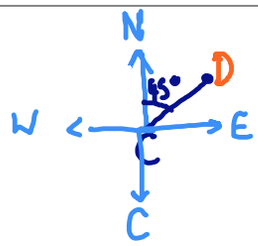
Give a reason for your answer.

[1 mark]

No, as the North line should be drawn at B, and the angle measured clockwise from that.

Do not write outside the box

16 (b) On a different map, the bearing of *D* from *C* is 045°



Nina says,

"*D* is North West of *C*."

Is Nina correct?

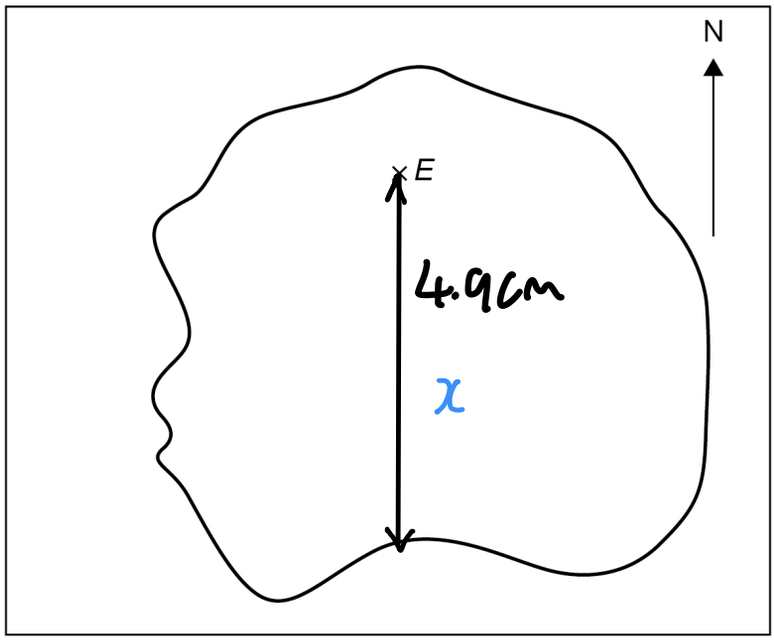
Give a reason for your answer.

[1 mark]

No, D is North East of C

16 (c) This map shows an airport, *E*, on an island.

Scale: 1 cm represents 100 km



A plane flies due South from the airport.

How far does it fly until it reaches the sea?

x4.9 ↓ 1cm = 100km ↓ x4.9
4.9cm = 490km

[3 marks]

whatever you measure distance x to be ←

Answer 490 km

5

Turn over ►

Do not write outside the box

17 (a) Simplify fully 56 : 24

[2 marks]

56 : 24 ÷2
28 : 12 ÷2
14 : 6 ÷2
7 : 3

Answer 7 : 3

17 (b) Write the ratio 5 : 4 in the form n : 1

[1 mark]

÷4 { 5 : 4 } ÷4
1·25 : 1

same operation to both sides

Answer 1·25 : 1

17 (c) Share £180 in the ratio 1 : 9

[2 marks]

1 + 9 = 10

$\frac{180}{10} = 18$ 1 part = £18

×18 { 1 : 9 } ×18
18 : 162

Answer £ 18 and £ 162

Do not write outside the box

18 Here is some data about the people listening to a radio station one day.

	Percentage	Mean number of hours listening	Range of number of hours listening
Aged 40 or under	21	1.2	4.5
Aged 41 or over	79	6.3	13.9

Compare the data for people aged 40 or under with the data for people aged 41 or over.
Make **three** comparisons.

[3 marks]

Comparison 1 more people above 41 listen to the show

Comparison 2 on average, people above the age listen to the show for longer

Comparison 3 over 40s have a higher range of hours listened

Turn over for the next question

8

Do not write outside the box

19 You are given that $4a - 2b = 10$

$4a - 2b = 2(2a - b) = 10$

$\downarrow$

$2a - b = 5$

19 (a) Write down the value of $2a - b$

[1 mark]

Answer 5

19 (b) Write down the value of $2b - 4a$

$-1(4a - 2b) = -4a + 2b$

$= 2b - 4a$

$\downarrow$

$-1(10) = -10$

[1 mark]

Answer -10

19 (c) You are given that $4a - 2b = 10$ **and** $a + c = 3$

Write an expression in a, b and c that is equal to 23

Give your answer in its simplest form.

You **must** show your working.

[2 marks]

$23 = 10 + 10 + 3$

EXPAND $\downarrow$

$= 4a - 2b + (4a - 2b) + (a + c)$

$= 4a - 2b + 4a - 2b + a + c$

collect like terms $\downarrow$

$23 = 9a - 4b + c$

Answer $9a - 4b + c$

Do not write outside the box

20 (a) Write 0.000 97 in standard form.

[1 mark]

Answer 9.7×10^{-4}

must be between 1 and 10

number of zeros in total

20 (b) Work out $\dfrac{3 \times 10^5}{4 \times 10^3}$

Give your answer as an ordinary number.

[2 marks]

$$\frac{3 \times 10^5}{4 \times 10^3} = \frac{3}{4} \times \frac{10^5}{10^3} \quad \left[\frac{a^m}{a^n} = a^{m-n}\right]$$

$$= 0.75 \times 10^2$$

$$= 75 \text{ as an ordinary number}$$

Answer 75

Turn over for the next question

7

Do not write outside the box

21 Anna plays a game with an ordinary, fair dice.

If she rolls 1 she wins.

If she rolls 2 or 3 she loses.

If she rolls 4, 5 or 6 she rolls again.

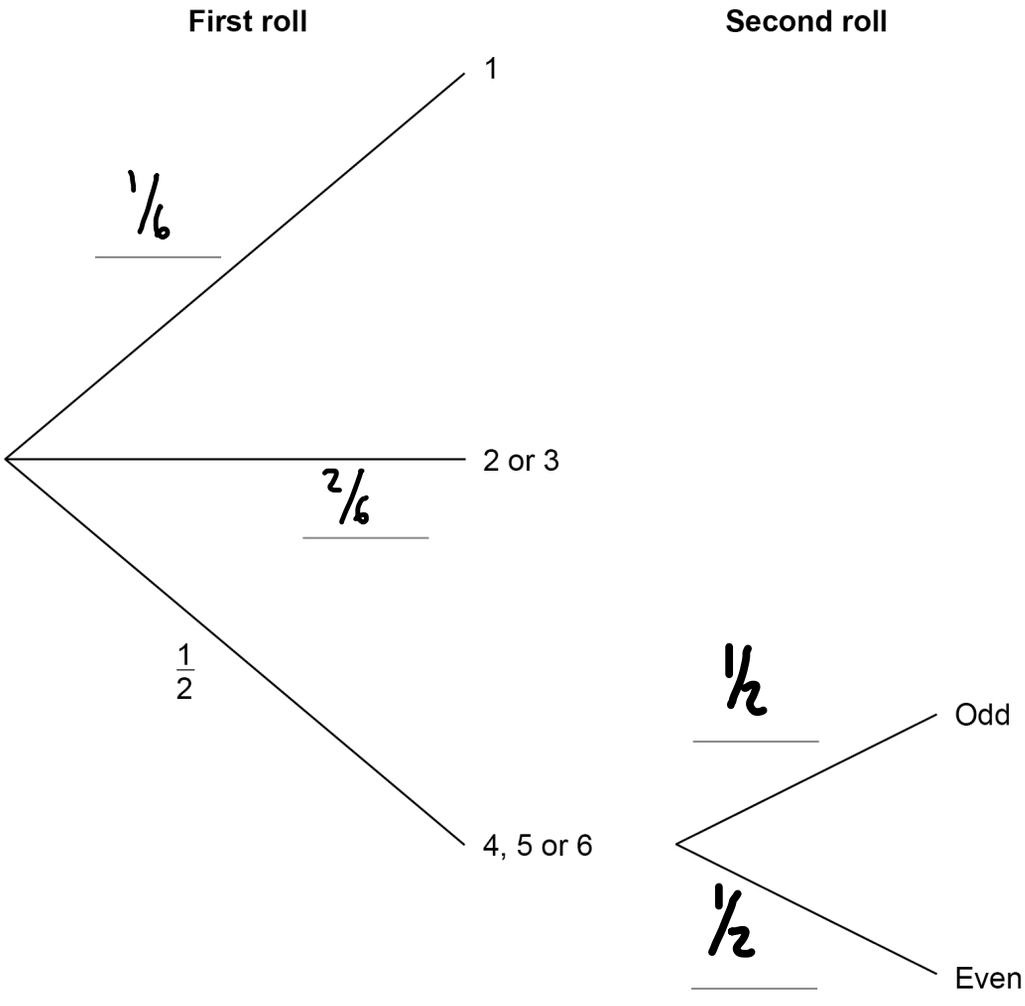
When she has to roll again,

if she rolls an odd number she wins

if she rolls an even number she loses.

21 (a) Complete the tree diagram with the four missing probabilities.

[2 marks]



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21 (b) Is Anna more likely to win or to lose?

You **must** work out the probability that she wins.

[4 marks]

$P(\text{Win}) = P(1 \text{ on first roll}) + P(4, 5 \text{ or } 6, \text{ then odd})$

$= \frac{1}{6} + \left(\frac{3}{6} \times \frac{1}{2}\right)$

$= \frac{1}{6} + \frac{3}{12}$

$= \frac{2}{12} + \frac{3}{12} = \frac{5}{12}$

$P(\text{lose}) = 1 - P(\text{win})$

$= 1 - \frac{5}{12} = \frac{7}{12}$

hence more likely to lose, as $7/12 > 5/12$

Turn over for the next question

6

Do not write outside the box

22 Three friends arrive at a party.

Their arrival increases the number of people at the party by 20%

In total, how many people are now at the party?

[2 marks]

let number at start = x

$x \times 1.2 = x + 3$

$1.2x = x + 3$ (−x)

$0.2x = 3$ (−x)

$x = \frac{3}{0.2} = \frac{30}{2} = 15$ (×10 / ×10)

hence, number of people at the party now = 15 + 3 = 18

Answer 18

Do not write outside the box

23 Work out the value of $(3^{12} \div 3^5) \div (3^2 \times 3)$

[3 marks]

$3 = 3^1$

$(3^{12} \div 3^5) \div (3^2 \times 3^1)$

$[a^m \div a^n = a^{m-n}]$ $[a^m \times a^n = a^{mn}]$

$= 3^7 \div 3^3$

$= 3^4 = 81$

Answer 81

24 (a) $a + b = 0$

Which of these is equal to b?
Circle your answer.

[1 mark]

0 $\frac{1}{a}$ a $-a$

24 (b) $c \times d = 1$

Which of these is equal to d?
Circle your answer.

[1 mark]

1 $\frac{1}{c}$ c $-c$

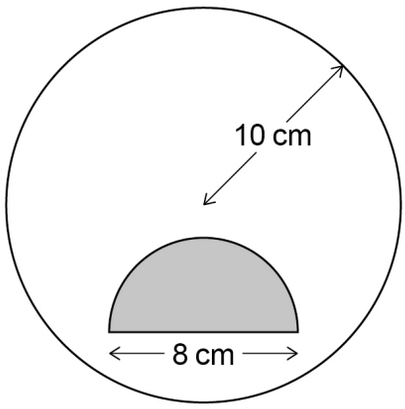
$\frac{1}{c} \times c$

7

Do not write outside the box

25 A shaded semicircle is inside a circle as shown.

Not drawn accurately



The **radius** of the circle is 10 cm

The **diameter** of the semicircle is 8 cm

How many times bigger is the unshaded area than the shaded area?

[4 marks]

area of circle = πr^2

area of large circle = $\pi \times 10^2$

$= 100\pi$

area of shaded semi circle = $\pi \times (4)^2 \times \frac{1}{2}$ (4 = half of diameter; $\frac{1}{2}$ = half a normal circle)

$= 8\pi$

therefore:

unshaded area = $100\pi - 8\pi = 92\pi$

shaded area = 8π

unshaded area ÷ shaded area

$92\pi \div 8\pi$ (11.5 / 8 | 92.0)

$= 11.5$

Answer 11.5

Do not write outside the box

26 The number of items, n, made in 1 hour by a machine is given by $n = \frac{60}{t}$

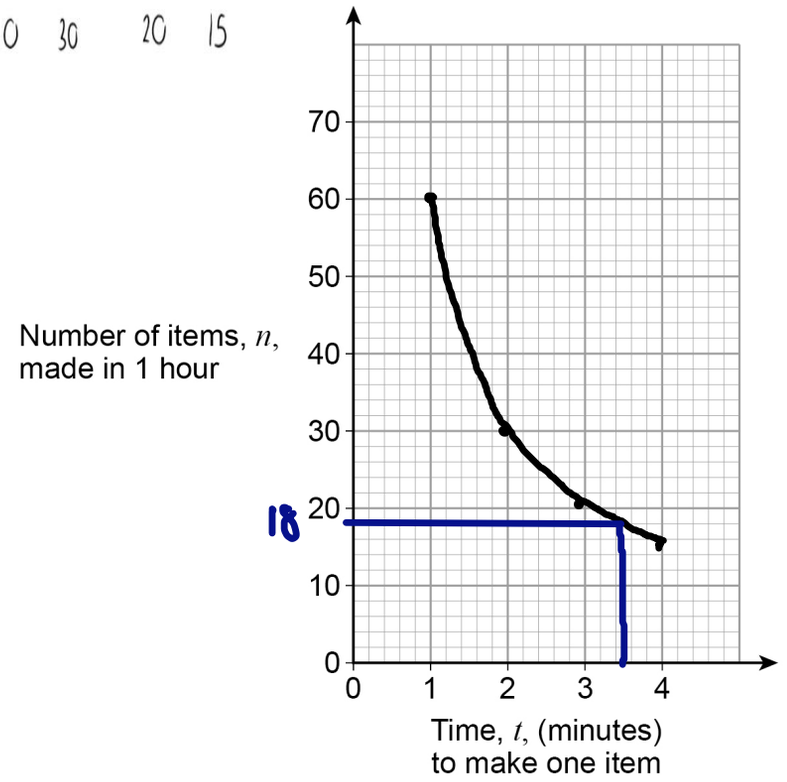
t is the time in minutes the machine takes to make one item.

The value of t changes for different types of item.

26 (a) On the grid below, draw the graph of $n = \frac{60}{t}$ for values of t from 1 to 4

[2 marks]

n	1	2	3	4
t	60	30	20	15



26 (b) The machine takes 3 minutes 30 seconds to make one item. = 3·5mins

Use your graph to estimate the value of n.

[2 marks]

Answer 18

8

Turn over ►

Do not write outside the box

27 Rearrange $x = 2y - 6$ to make y the subject.

[2 marks]

$x = 2y - 6$

$+6$ $\quad x + 6 = 2y \quad +6$

$\times \frac{1}{2}$ $\quad \frac{1}{2}(x + 6) = y \quad \times \frac{1}{2}$

Answer $\frac{1}{2}(x+6)$

28 Multiply out and simplify $(x + 5)(x - 1)$

[2 marks]

$(x+5)(x-1)$

F O I L

$= x^2 - x + 5x - 5$

$= x^2 + 4x - 5$

Answer $x^2 + 4x - 5$

END OF QUESTIONS

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