Write your name here

Surname	Other Names

Mathematics

November 2022 Practice Paper 3 (Calculator)
Foundation Tier

Time: 1 hour 30 minutes

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.
- **Calculators may be used**.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working.**

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.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Foundation Tier Formulae Sheet

Perimeter, area and volume

Where a and b are the lengths of the parallel sides and h is their perpendicular separation:

Area of a trapezium = $\frac{1}{2}(a + b)\, h$

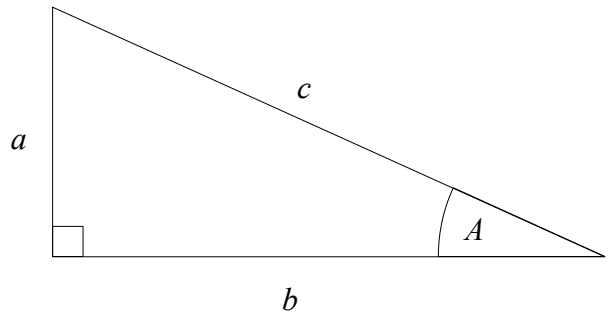
Volume of a prism = area of cross section × length

Where r is the radius and d is the diameter:

Circumference of a circle = $2\pi r = \pi d$

Area of a circle = πr^2

Pythagoras' Theorem and Trigonometry



In any right-angled triangle where a, b and c are the length of the sides and c is the hypotenuse:

$$a^2 + b^2 = c^2$$

In any right-angled triangle ABC where a, b and c are the length of the sides and c is the hypotenuse:

$$\sin A = \frac{a}{c} \qquad \cos A = \frac{b}{c} \qquad \tan A = \frac{a}{b}$$

Compound Interest

Where P is the principal amount, r is the interest rate over a given period and n is number of times that the interest is compounded:

Total accrued = $P\left(1 + \frac{r}{100}\right)^n$

Probability

Where P (A) is the probability of outcome A and P (B) is the probability of outcome B:

P (A or B) = P (A) + P (B) – P (A and B)

END OF EXAM AID

1 Write $\frac{7}{10}$ as a decimal.

0.7

(Total for Question 1 is 1 mark)

2 Write down the value of the 2 in the number 6024

20

(Total for Question 2 is 1 mark)

3 Change 0.87 kilograms to grams.

x 1000

870 ..... grams

(Total for Question 3 is 1 mark)

4 Write down a multiple of 7 that is between 20 and 30

21 or 28

21

(Total for Question 4 is 1 mark)

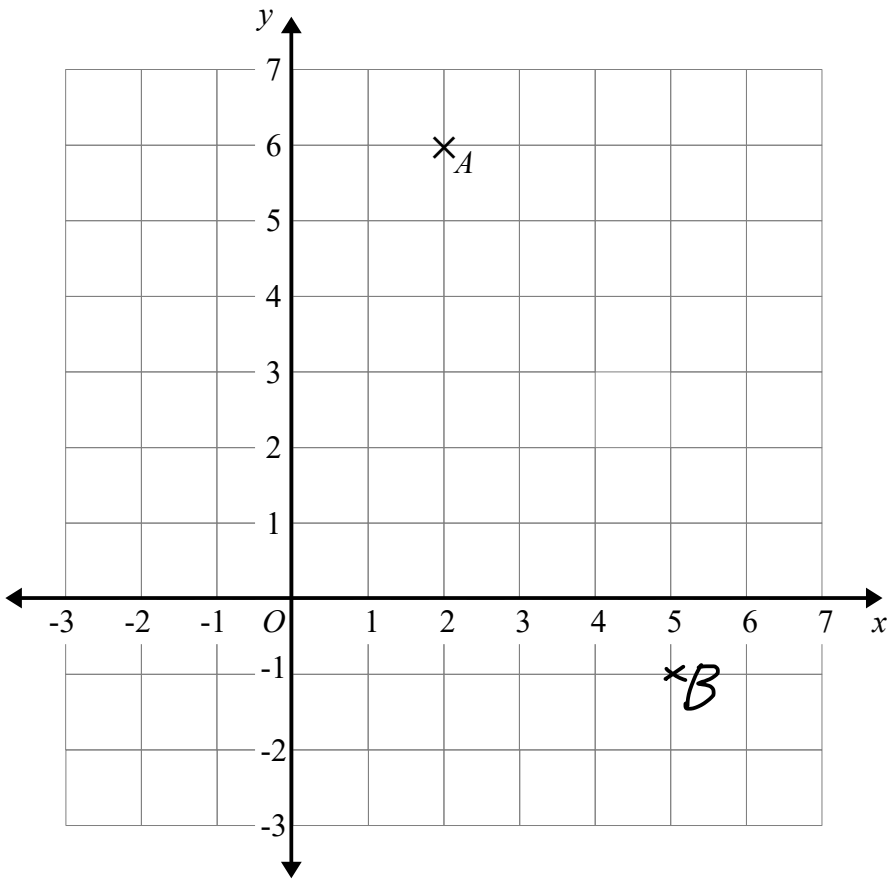
5 Write the following numbers in order of size.
Start with the smallest number.

3.2 3.27 3.72 3.702 3.02

3.02 3.2 3.27 3.702 3.72

(Total for Question 5 is 1 mark)

6



(a) Write down the coordinates of point *A*.

(…2… , …6…)

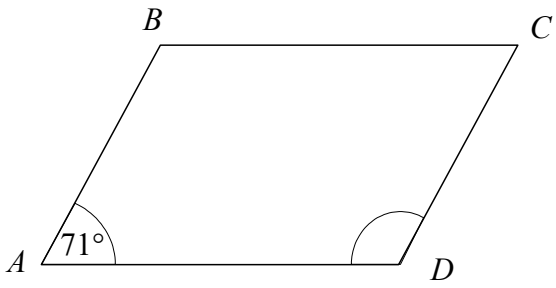
(1)

(b) On the grid mark with a cross (×) the point (5, –1).
Label this point *B*.

(1)

(Total for Question 6 is 2 marks)

7 *ABCD* is a parallelogram



(a) Work out the size of the angle *ADC*.

180 − 71

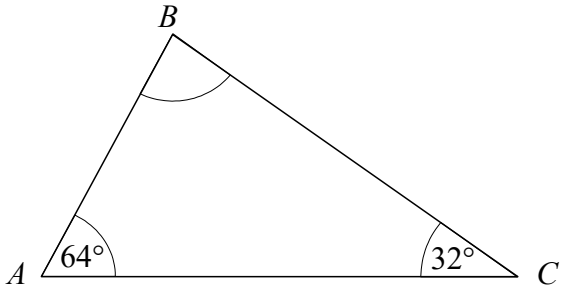
109 °

(b) Give a reason for your answer.

Cointerior angles add to 180°

(Total for Question 7 is 2 marks)

8



180 − 64 − 32

(a) Work out the size of the angle *ABC*.

84 °

(b) Give a reason for your answer.

Angles in a triangle add to 180°

(Total for Question 8 is 2 marks)

9 The nth term of a sequence is 4n + 3

(a) Find the first two terms of this sequence.

$4(1) + 3 = 7$

$4(2) + 3 = 11$

7 , 11

(b) Is 35 a term in this sequence.
You must show how you get your answer.

$4(8) + 3 = 35$

Yes. It is the 8th term.

(Total for Question 9 is 2 marks)

10 Amelia and Sophie did a test.
The total for the test was 75 marks.

Amelia got 56% of the 75 marks.
Sophie got 43 out of 75

Who got the highest mark?
You must show all your working.

$0.56 \times 75 = 42$

Sophie $43 > 42$

(Total for Question 10 is 2 marks)

11 2 calculators cost £10.40 ×15
3 pens cost £3.54 ×10

Jude wants to buy 30 calculators and 30 pens.
He only has £200

Does Jude have enough money to buy 30 calculators and 30 pens?
You must show how you get your answer.

10.40 × 15 = 156

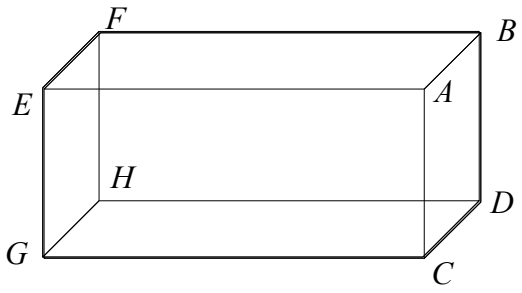
3.54 × 10 = 35.40

156 + 35.4 = £191.40

Yes

(Total for Question 11 is 4 marks)

12



The diagram shows a cuboid *ABCDEFGH*
ABCD is a square with area 25cm^2.
CG = 12 cm.

Find the volume of the cuboid. 25 × 12

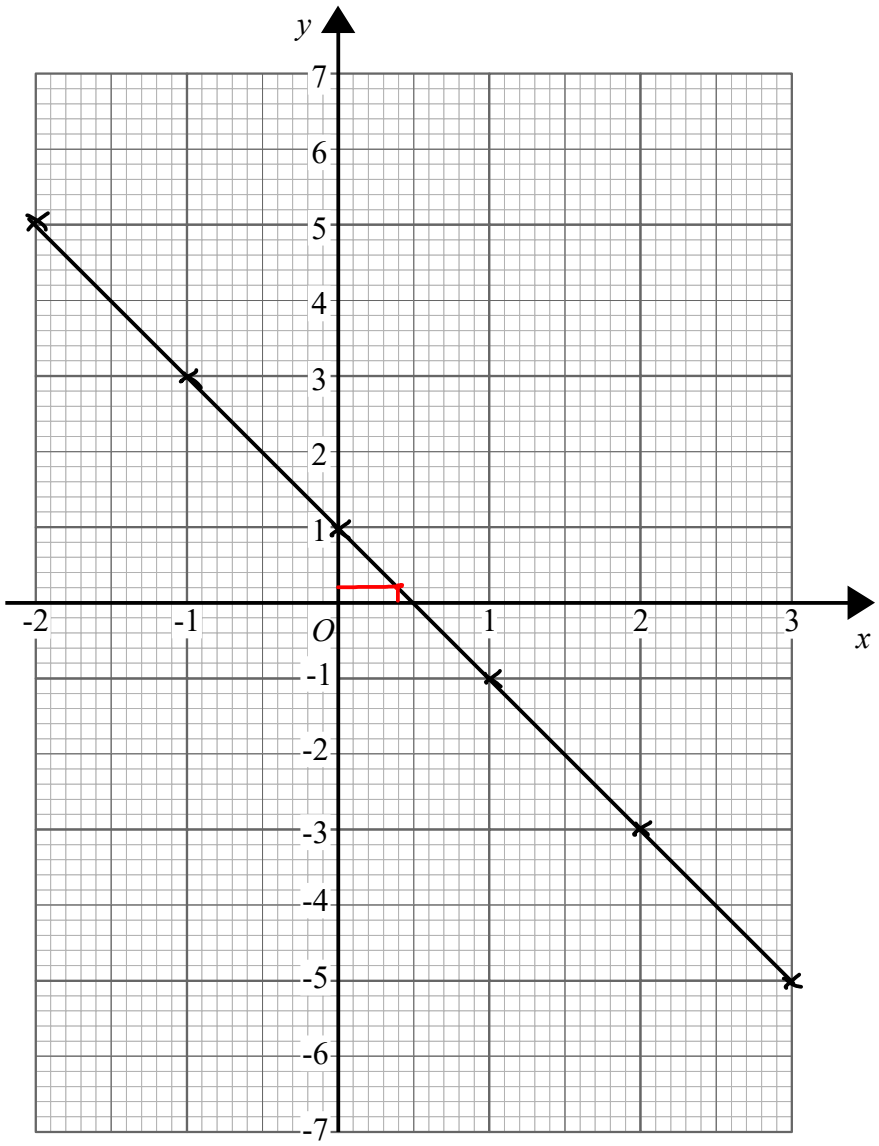
300 ….....cm^3

(Total for Question 12 is 2 marks)

13 (a) Complete the table of values for $y = 1 - 2x$

x	-2	-1	0	1	2	3
y	5	3	1	−1	-3	−5

(2)



(b) On the grid draw the graph of $y = 1 - 2x$ for values of x from –2 to 3 (2)

(c) Use your graph to find the value of y when $x = 0.4$

0.2

(1)

(Total for Question 13 is 5 marks)

14 Use your calculator to work out $\dfrac{12.74 + \sqrt{9.5}}{6.04 \times 4.1}$

(a) Write down all the figures on your calculator display.

0.638919681 9

(2)

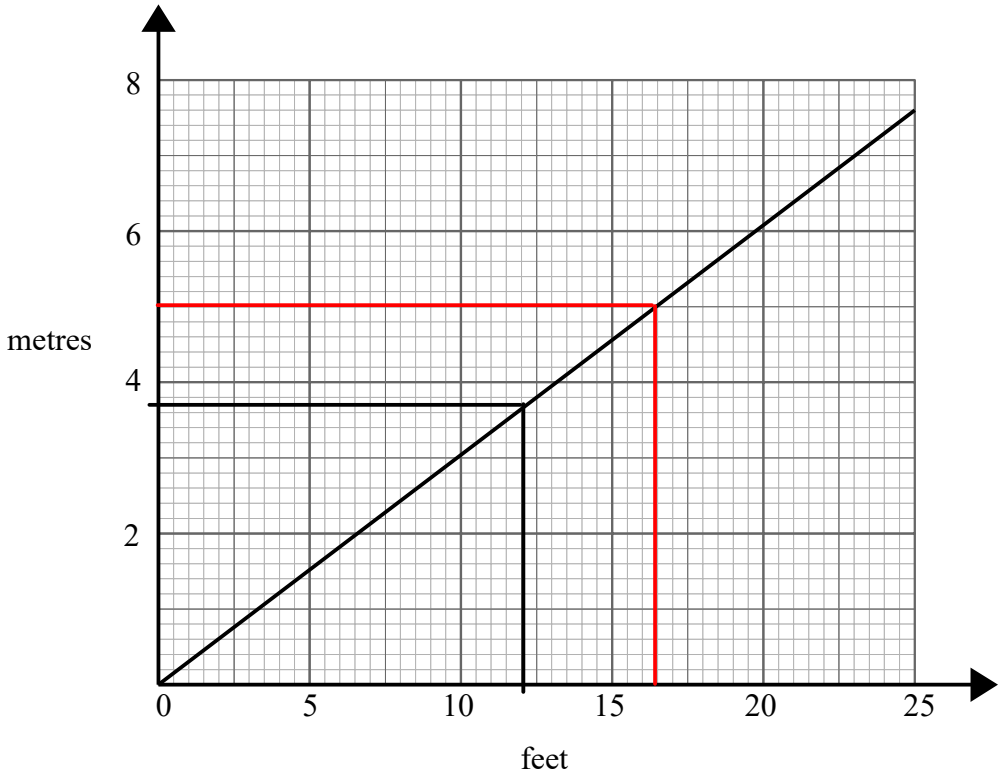
(b) Write your answer to part (a) correct to 2 significant figures.

0.64

(1)

(Total for Question 14 is 3 marks)

15 You can use this graph to change between feet and metres.



(a) Change 12 feet to metres.

3.7 metres
(3.6 or 3.7) (1)

(b) Change 25 metres to feet.

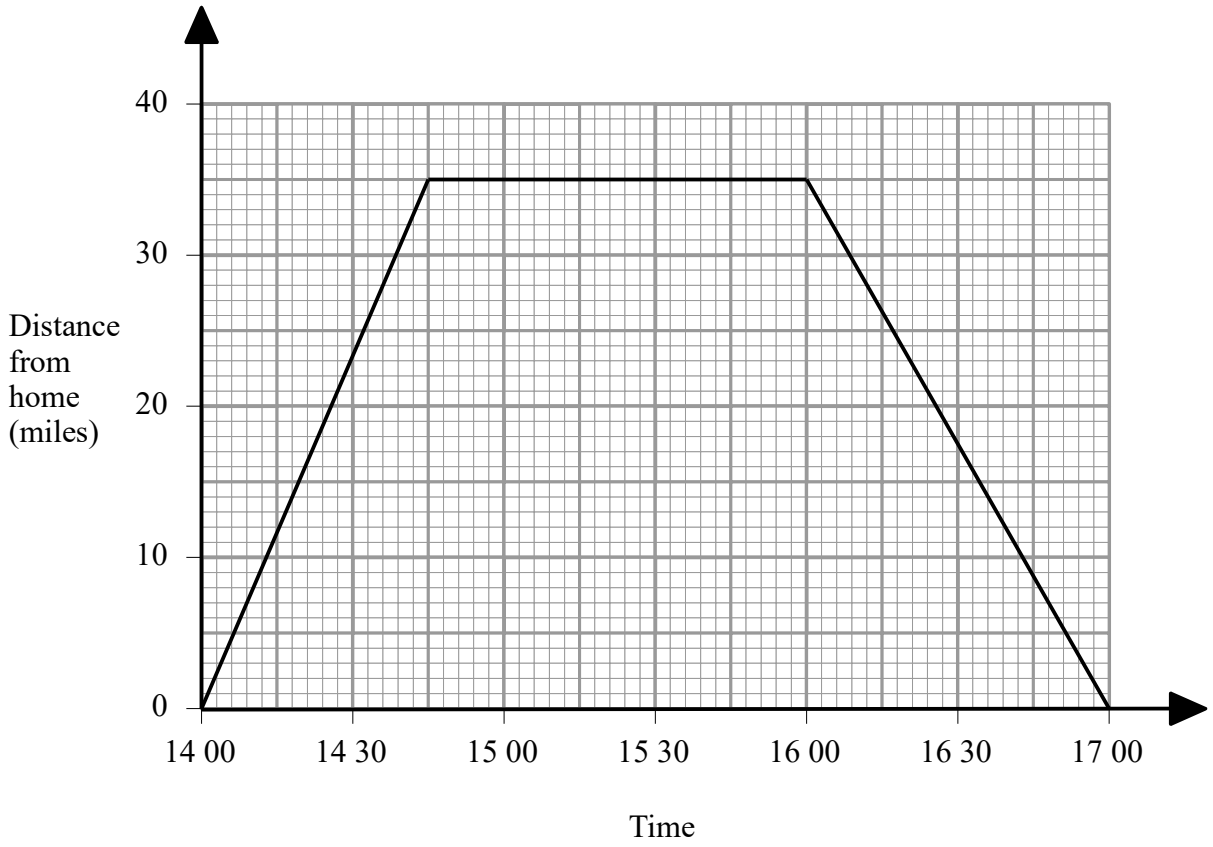
5m = 16.5ft
×5 ×5
25m = 82.5 ft

82.5 feet
(81 – 83) (2)

(Total for question 15 is 3 marks)

16 Emily drove to the beach. She stayed at the beach and then she drove back home.

Here is Emily's travel graph.



(a) For how many minutes did Emily stay at the beach?

1445 to 1600

1 hour 15 mins

…75……minutes
(1)

(b) What was Emily's average speed on her **journey to the beach**?

35 miles in 45 mins

45 mins = 0.75 hours

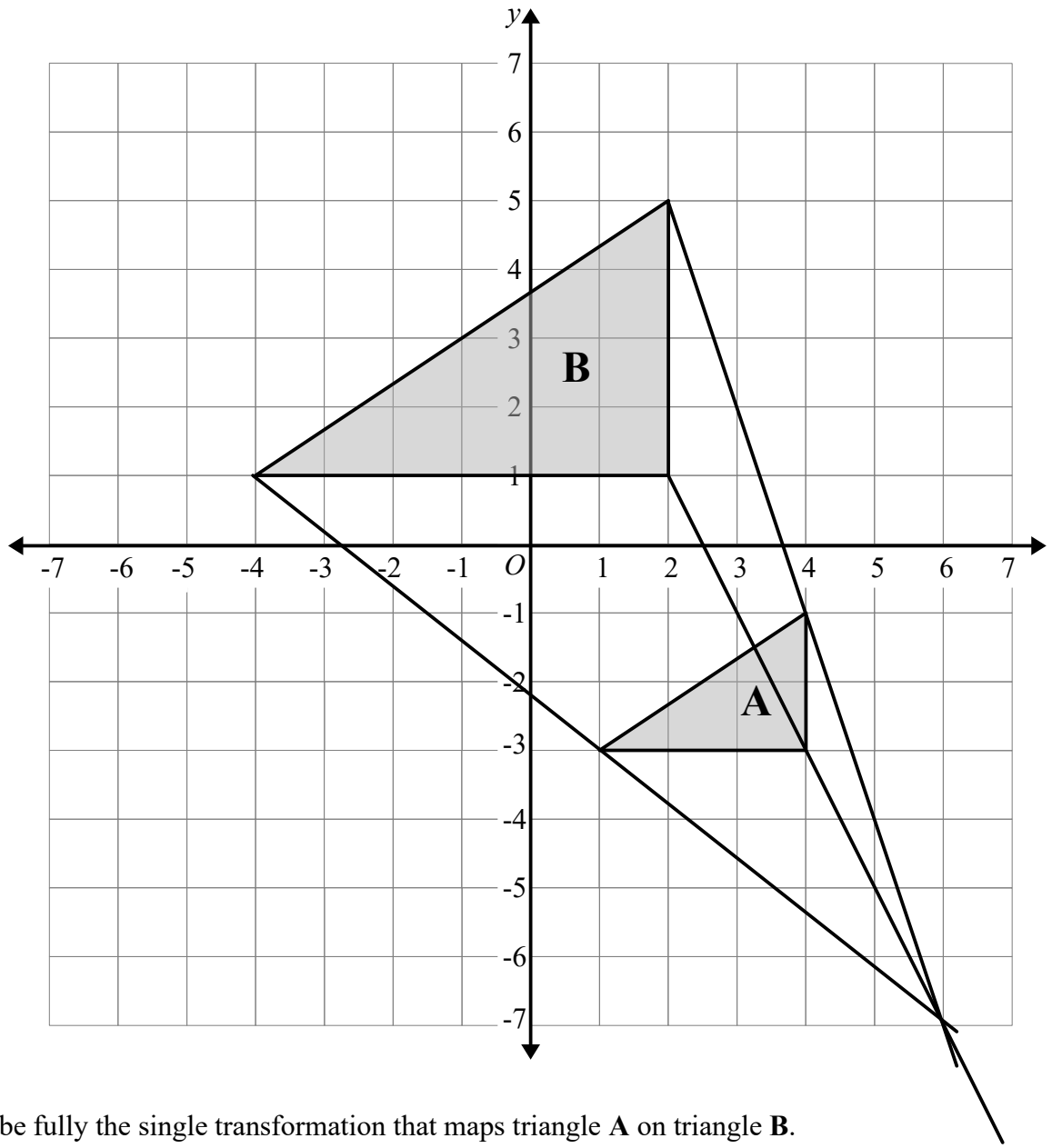
speed = $\frac{\text{distance}}{\text{time}}$

$\frac{35}{0.75} = 46.\dot{6}$

…46.6……miles/hour
(2)

(Total for Question 16 is 3 marks)

17



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

Enlargement, Scale Factor 2, Centre (6, -7)

(Total for Question 17 is 2 marks)

18 The table shows some information about the colours of cars parked in a car park.

Colour	Frequency
Black	24
Silver	16
White	15
Blue	5
	60

Degrees
144
96
90
30
360
× 6

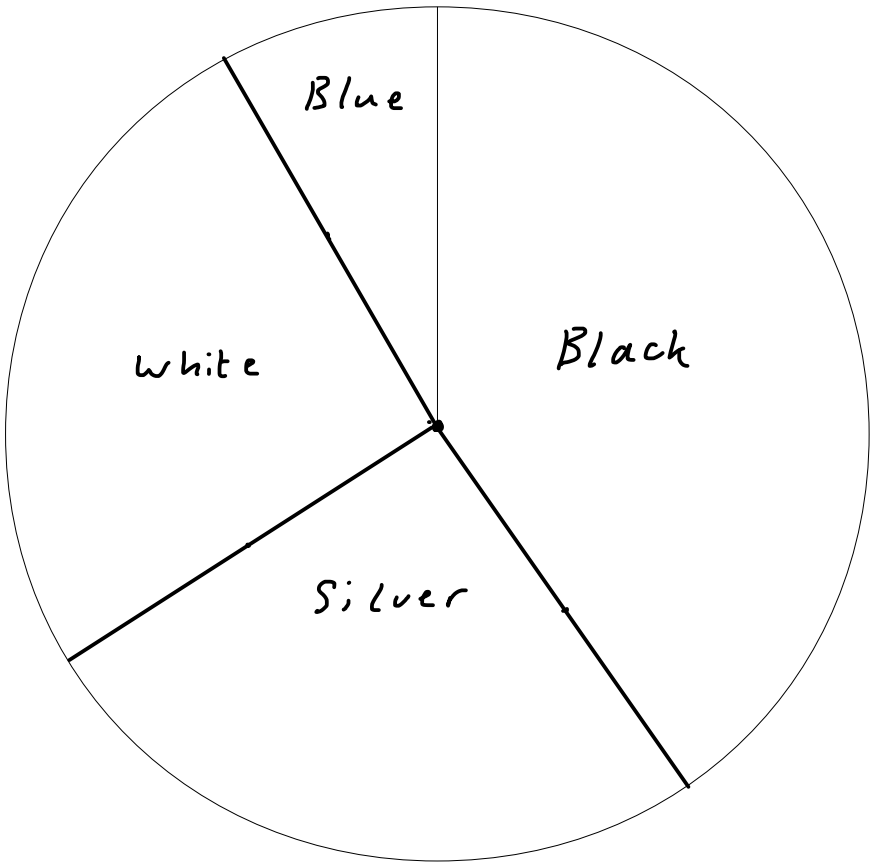
(a) What fraction of cars are white?
Give your answer in its simplest form.

$\frac{15}{60} = \frac{1}{4}$

$\frac{1}{4}$

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

(2)



(4)

(Total for Question 18 is 6 marks)

19 $m = n - 5p$

Make p the subject of the formula.

$m + 5p = n$

$5p = n - m$

$p = \frac{n-m}{5}$

$p = \frac{n-m}{5}$

(Total for Question 19 is 2 marks)

20 (a) Write 5.2×10^{-1} as an ordinary number.

0.52

(1)

(b) Work out the value of $(3.2 \times 10^3) \times (6.5 \times 10^4)$
Give your answer in standard form.

208000000

2.08×10^8

(2)

(Total for Question 20 is 3 marks)

21 Write 30 kilometres per hour in metres per second

30 × 1000 = 30000

30 000 m per hour ÷ 60

500 m per minute ÷ 60

$\frac{25}{3}$ m/s

.....8.3..... m/s

(Total for Question 21 is 2 mark)

22 In a bag there are blue sweets, red sweets and yellow sweets.

The number of red sweets is three times the number of blue sweets.
The number of yellow sweets is half the number of red sweets.

Write down the ratio of blue sweets to red sweets to yellow sweets.
Give your answer in the form $a : b : c$ where a, b and c are whole numbers

R : B : Y

3 : 1 : 1.5

6 : 2 : 3

B : R : Y

2 : 6 : 3

.....2 : 6 : 3.....

(Total for Question 22 is 2 marks)

23 Bob is going to make some orange paint.
He needs to mix red paint, yellow paint and white paint in the ratio 5 : 4 : 1

Bob wants to make 750 m*l* of orange paint. 10 parts

Bob has

400 m*l* of red paint
300 m*l* of yellow paint ← he has
200 m*l* of white paint

Does Bob have enough red paint, yellow paint and white paint to make the orange paint?
You must show all your working.

$\frac{750}{10} = 75$ (ml per part) ← he needs

Red: $75 \times 5 = 375$ ml ✓

Yellow: $75 \times 4 = 300$ ml ✓

White: $75 \times 1 = 75$ ml ✓

Yes Bob has enough

(Total for Question 23 is 4 marks)

24 A shop sells small chocolate bars and large chocolate bars.

There are
small chocolate bars are sold in packs of 4
large chocolate bars are sold in packs of 9

On one day

the number of packs of small chocolate bars sold : the number of packs of large chocolate bars sold = 5 : 2

× 4 × 9

20 : 18

small bars ↑ large bars ↑

A total of 266 chocolate bars were sold.

Work out the number of small chocolate bars sold.

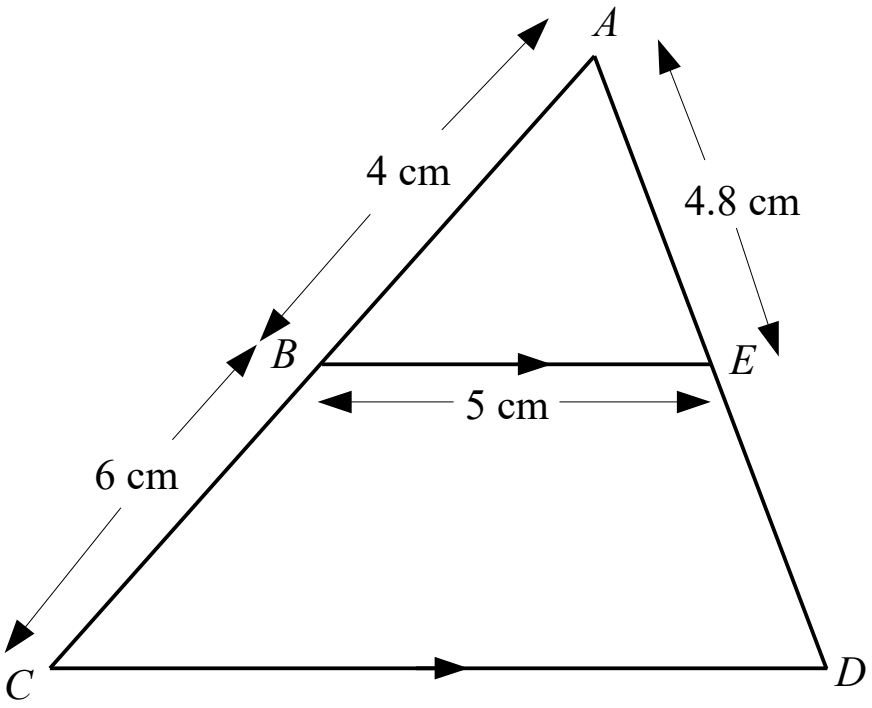
$\frac{266}{38} = 7$

$20 \times 7 = 140$

140

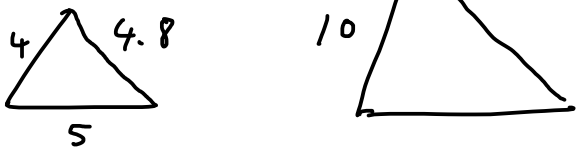
(Total for Question 24 is 4 marks)

25



BE is parallel to *CD*.
ABC and *AED* are straight lines.
AB = 4 cm, *BC* = 6 cm, *BE* = 5 cm, *AE* = 4.8 cm.

× 2.5 →



(a) Calculate the length of *CD*.

$\frac{10}{4} = 2.5$

5×2.5

12.5 cm

(2)

(b) Calculate the length of *ED*.

$4.8 \times 2.5 = 12$ (AD)

$12 - 4.8 = 7.2$

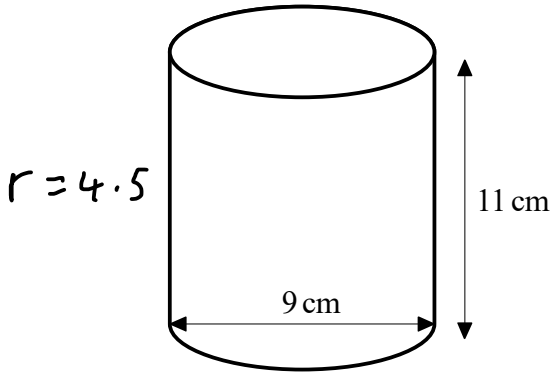
7.2 cm

(2)

(Total for Question 25 is 4 marks)

26 A cylinder has a diameter of 9 cm and a height of 11 cm.

Work out the volume of the cylinder.
Give your answer correct to 1 decimal place.



volume = $\pi r^2 h$

$= \pi (4.5)^2 (11)$

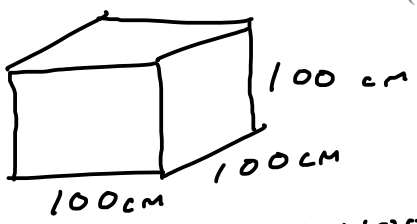
$= 699.8 \text{ cm}^3$

699.8 cm^3

(2)

(b) The volume of another cylinder is 1500 cm^3.
Michael says that 1500cm^3 is the same as 15 m^3.

Is Michael correct?
You must give a reason for your answer.



$100 \times 100 \times 100 = 1000000$

No $1 \text{m}^3 = 1000000 \text{ cm}^3$

$15 \text{m}^3 = 15000000 \text{ cm}^3$

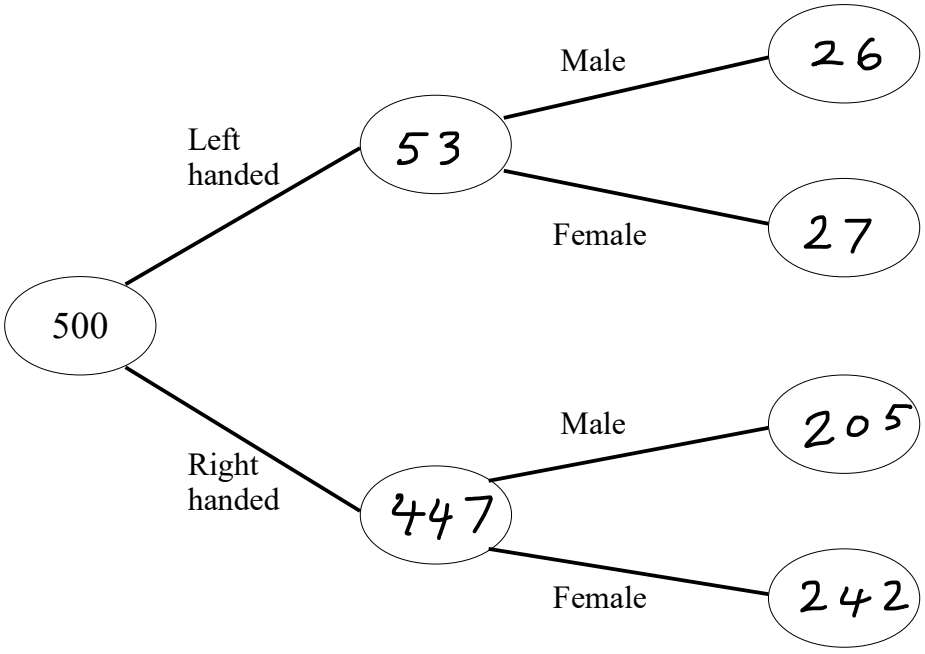
(1)

(Total for Question 26 is 3 marks)

27 500 people were surveyed.
All of the people were either left handed or right handed.

53 of the people are left handed.
26 males are left handed.
231 of the people are male.

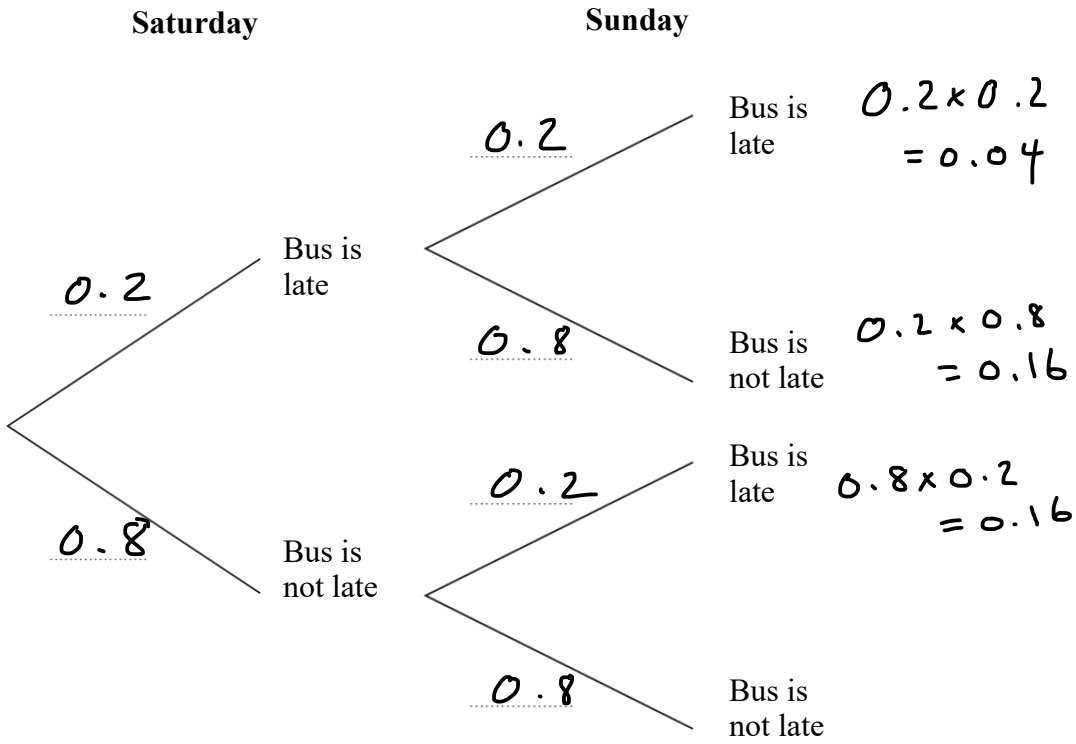
(a) Use this information to complete the frequency tree.



(Total for Question 27 is 2 marks)

28 Bradley gets the bus on Saturday and Sunday.
The probability that Bradley's bus will be late on any day is 0.2

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that Bradley's bus is late on at least one of these days.

$0.04 + 0.16 + 0.16 = 0.36$

0.36

(2)

(Total for Question 28 is 4 marks)

29 Michael recorded the maximum temperature every day in September.

The table shows information about his results.

Temperature (°C)	m.p	Frequency	mp × f
$14 < t \leqslant 18$	16	4	64
$18 < t \leqslant 20$	19	10	190
$20 < t \leqslant 22$	21	8	168
$22 < t \leqslant 24$	23	5	115
$24 < t \leqslant 28$	26	3	78
		30	615

Calculate an estimate for the mean maximum temperature.

$$\frac{615}{30} = 20.5\,^{\circ}C$$

20.5 .....°C

(Total for Question 29 is 3 marks)

30 $\boldsymbol{a} = \begin{pmatrix} 4 \\ 1 \end{pmatrix}$ and $\boldsymbol{b} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$

(a) Write down as a column vector

(i) $\mathbf{a} + \mathbf{b}$

$\begin{pmatrix} 4 \\ 1 \end{pmatrix} + \begin{pmatrix} 3 \\ 2 \end{pmatrix}$

$\begin{pmatrix} 7 \\ 3 \end{pmatrix}$

.....

(1)

(ii) $2\mathbf{a} - \mathbf{b}$

$\begin{pmatrix} 8 \\ 2 \end{pmatrix} - \begin{pmatrix} 3 \\ 2 \end{pmatrix}$

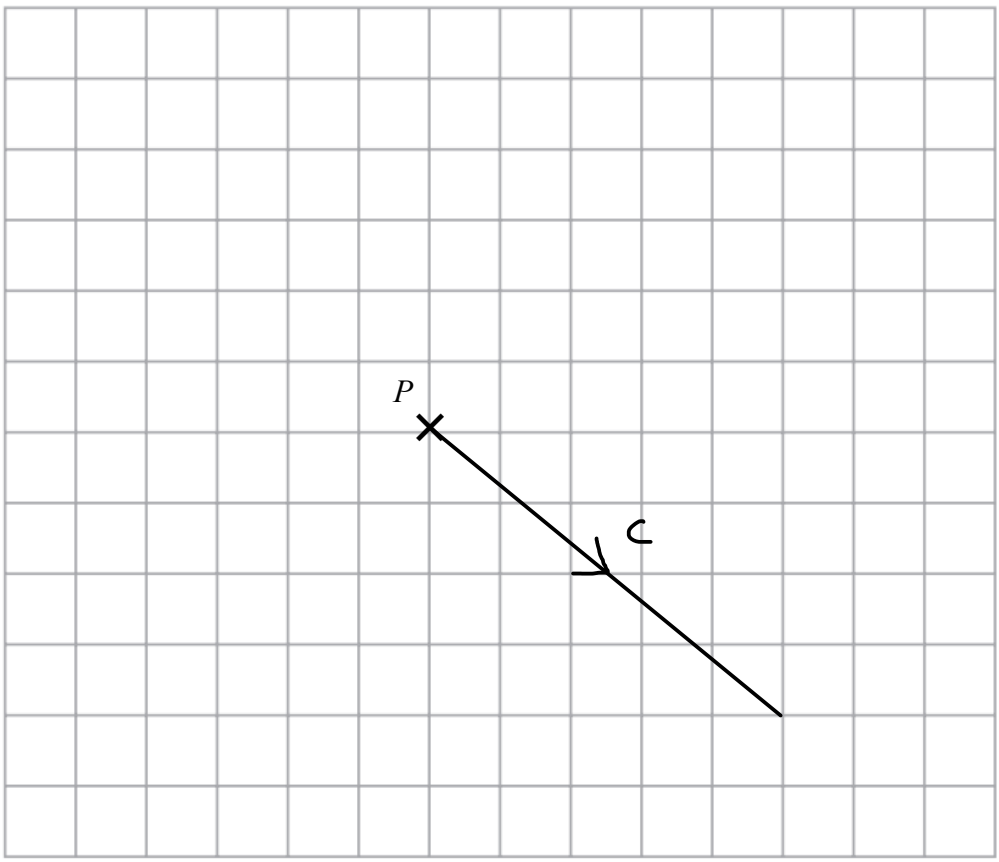
$\begin{pmatrix} 5 \\ 0 \end{pmatrix}$

.....

(2)

$\boldsymbol{c} = \begin{pmatrix} 5 \\ -4 \end{pmatrix}$

(b) From the point *P*, draw the vector **c**



(1)

(Total for Question 30 is 4 marks)