Write your name here

Surname	Other Names

Mathematics

June 2024 Practice Paper 2 (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 = $\frac{1}{2}(a + b)\, h$

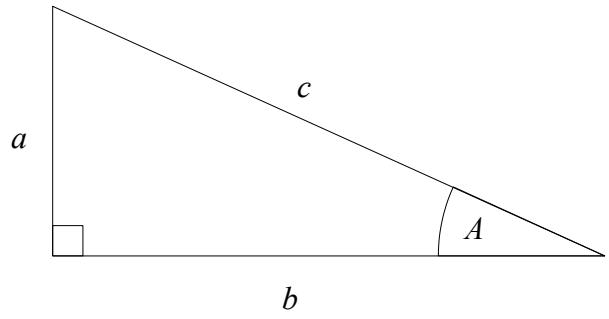
Volume of a prism = area of cross section × length

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 Change 450 centimetres into metres.

100 cm = 1 m

450 ÷ 100 = 4.5

4.5 metres

(Total for Question 1 is 1 mark)

2 Simplify $3f + 5f - f$

8f - 1f

7f

(Total for Question 2 is 1 mark)

3 Work out 10% of 540

540 ÷ 10

54

(Total for Question 3 is 1 mark)

4 Write down a multiple of 7 that is between 40 and 50

42 or 49

49

(Total for Question 4 is 1 mark)

5 Work out 2.5^2

6.25

(Total for Question 5 is 1 mark)

6 A film starts at 7.55 pm.
The film lasts 88 minutes.

What time does the film finish?

5 mins + 60 mins + 23 mins

to 8 pm

to 9 pm

to 9.23 pm

9.23 pm

(Total for Question 6 is 2 marks)

7 A taxi company uses the rule below to work out the cost of a journey.

Fare = £1.50 + £2.25 per mile

Work out the cost of a 6 mile journey with the taxi company.

1.50 + 2.25 × 6

£ 15

(Total for Question 7 is 2 marks)

8 There are some counters in a bag.
The table shows the number of counters of each colour.

Colour	Red	Blue	Yellow	Green
Number of Counters	7	2	5	3

$7+2+5+3=17$

A counter is taken at random from the bag.

(a) Write down the probability that the counter is green.

$\frac{3}{17}$

(1)

(b) Write down the probability that the counter is not blue.

2 Blue, 15 Not Blue

$\frac{15}{17}$

(2)

(Total for Question 8 is 3 marks)

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9 Felicity has three bags of sweets, **A**, **B** and **C**.

Bag **A** and bag **B** have the same number of sweets.
Bag **C** has 35 sweets in it.

In the three bags, there is a total of 119 sweets.

Work out the number of sweets in bag **A**.

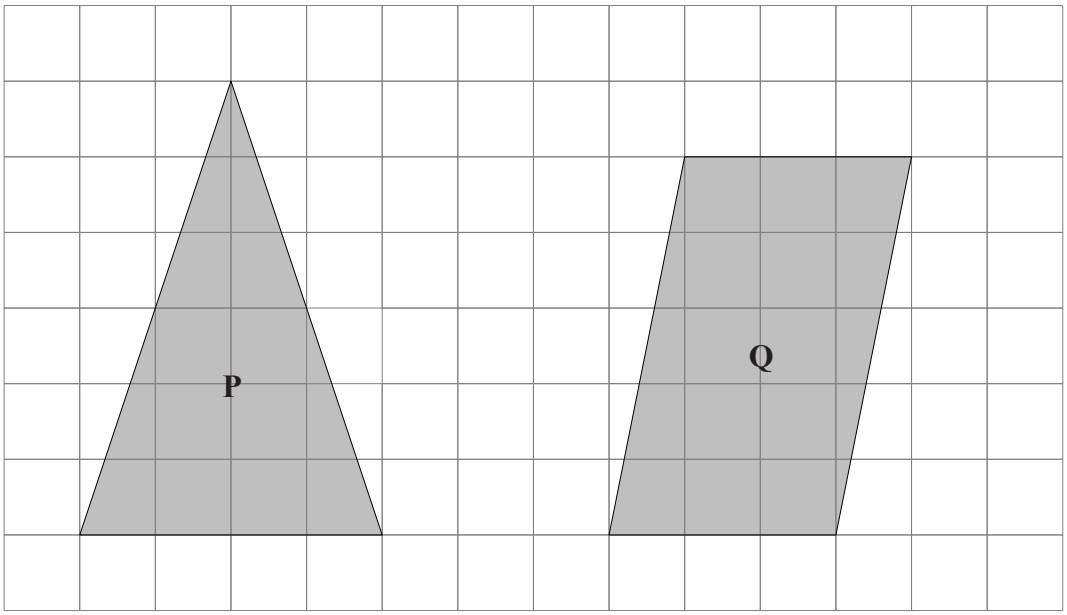
$119 - 35 = 84$

$84 \div 2 = 42$

42

(Total for Question 9 is 3 marks)

10 The diagram shows two shapes on a centimetre grid.



(a) Find the area of shape **P**

$$\frac{4 \times 6}{2}$$

12 cm²

(2)

(b) Write down the mathematical name for shape **Q**.

parallelogram

(1)

(c) Find the area of shape **Q**.

3×5

15 cm²

(2)

(Total for Question 10 is 5 marks)

11 (a) Work out $\frac{3}{8}$ of 140

$\frac{3}{8} \times 140$

52.5

(2)

(b) Write the following fractions in order of size.
Start with the smallest fraction.

$\frac{7}{8}$ $\frac{13}{16}$ $\frac{3}{4}$ $\frac{25}{32}$

$\frac{28}{32}$ $\frac{26}{32}$ $\frac{24}{32}$ $\frac{25}{32}$

$\frac{3}{4}$ $\frac{25}{32}$ $\frac{13}{16}$ $\frac{7}{8}$

(2)

(Total for Question 11 is 4 marks)

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12 The first term of a sequence of numbers is 17
The term-to-term rule of this sequence is 'add 4'

17 21 25 29 ...

Is 92 a number in this sequence?
Give a reason for your answer.

No. All the numbers in the sequence are odd.

(Total for Question 12 is 1 mark)

13 Anne and George did a test.
The total for the test was 75 marks.

Anne got 72% of the 75 marks.
George got 55 out of 75

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

72% or 75

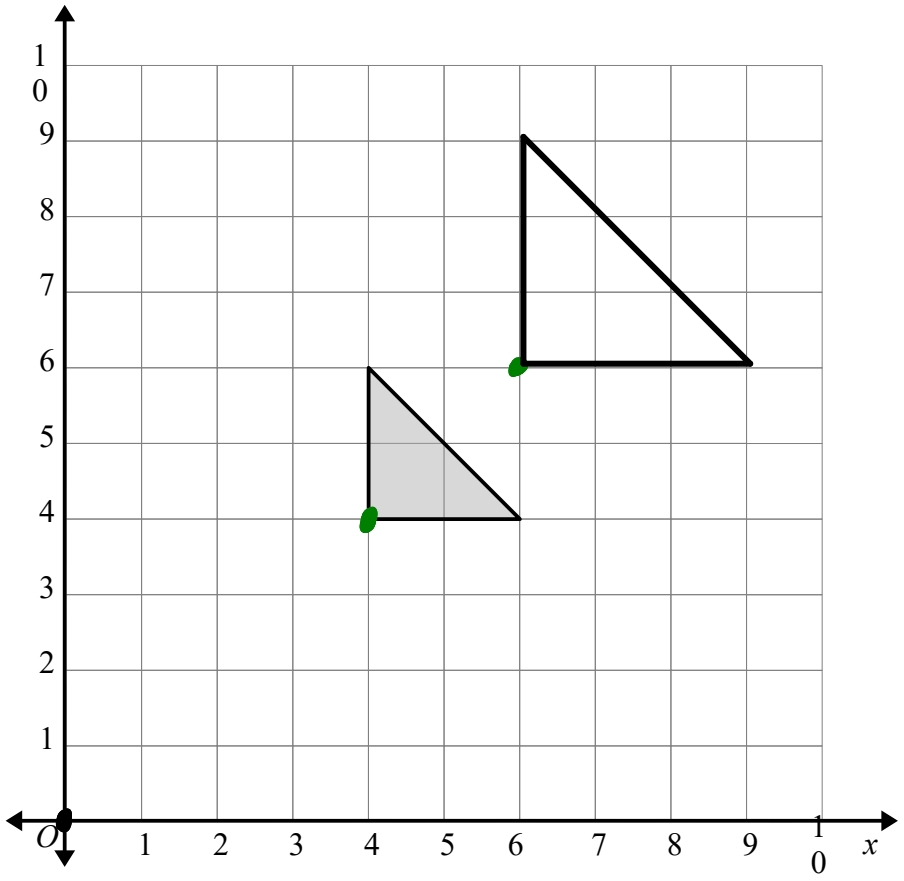
72% × 75 = 54

or 0.72 × 75

George 55 > 54

(Total for Question 13 is 2 marks)

14



$\begin{pmatrix} 4 \\ 4 \end{pmatrix} \times 1.5$

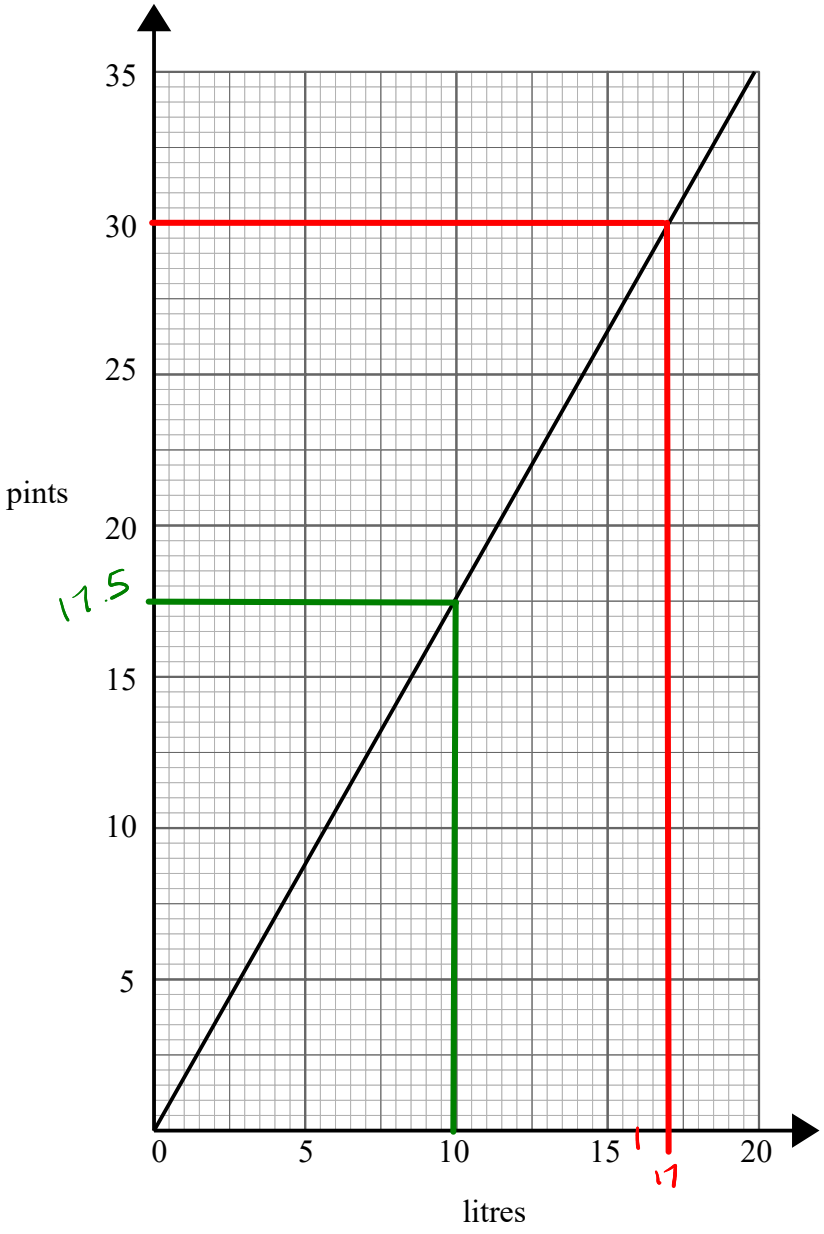
$= \begin{pmatrix} 6 \\ 6 \end{pmatrix}$

$2 \times 1.5 = 3$

Enlarge the shaded triangle by scale factor 1.5, centre *O*.

(Total for Question 14 is 2 marks)

15 You can use this graph to change between litres and pints.



(a) Change 10 litres to pints.

17.5 pints

(1)

(b) Change 90 pints to litres.

30 pints = 17 litres

×3 ×3

90 pints = 51 litres

51 litres

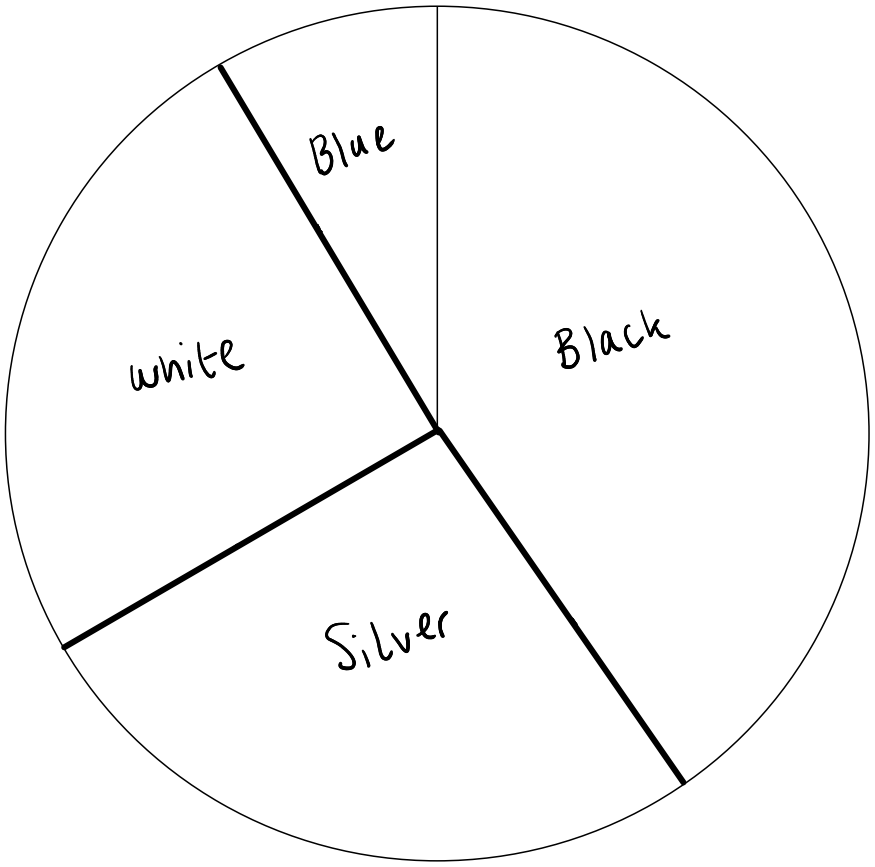
(2)

(Total for Question 15 is 3 marks)

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

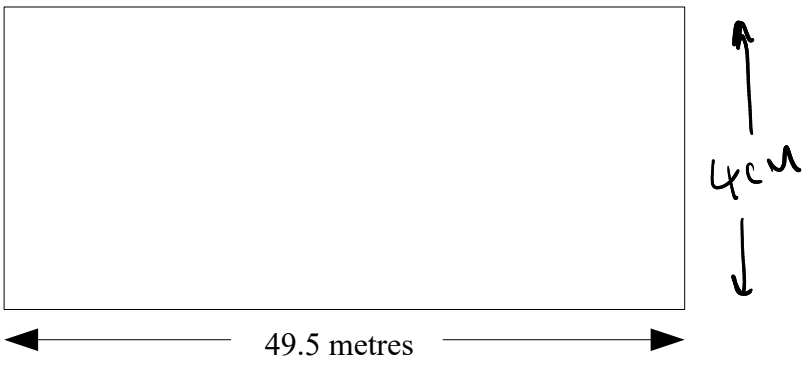
Colour	Frequency		Angle
Black	24	x6	144
Silver	16	x6	96
White	15	x6	90
Blue	5	x6	30
	60	x6	360

Draw an accurate pie chart to show this information.



(Total for Question 16 is 3 marks)

17 The accurate scale drawing shows a field.



The field has a real length of 49.5 metres 9cm

Find an estimate for the real area of the field.

$49.5 \div 9 = 5.5$

$5.5 \times 4 = 22\text{ m}$

Area $= 49.5 \times 22 = 1089\text{ m}^2$

1089 ..... m^2

(Total for Question 17 is 3 marks)

18 (a) Factorise $10 - 15a$

$5(2 - 3a)$

(b) Factorise fully $3x^2y + 6xy^2$

(1)

$3xy(x + 2y)$

(2)

(Total for Question 18 is 3 marks)

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19 Last season a football team scored 38 goals.
This season the football team scored 77 goals.

Work out the percentage increase in the number of goals scored.

$$\frac{\text{change}}{\text{original}} \times 100$$

$$\frac{77 - 38}{38} \times 100 = 102.63\%$$

103 %

(Total for Question 19 is 3 marks)

20 The height of a building is 310 metres, correct to the nearest metre.

Complete the error interval for the height of the building.

309.5 m ≤ length < 310.5 m

(Total for Question 20 is 2 marks)

21 Work out $(3.12 \times 10^{-6}) \div (2.5 \times 10^{-4})$

Give your answer in standard form.

0.01248

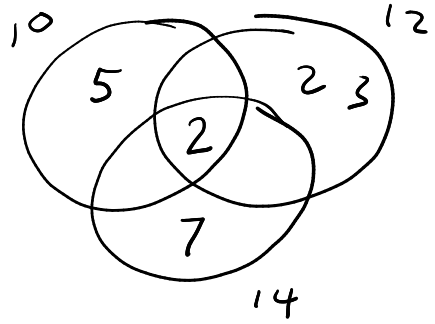
1.248×10^{-2}

1.248×10^{-2}

(Total for Question 21 is 2 marks)

22 Three buses, bus A, bus B and bus C, all use the same bus stop.

Bus A runs every 10 minutes. 2×5
Bus B runs every 12 minutes. $2 \times 2 \times 3$
Bus C runs every 14 minutes. 2×7



All three buses are at the bus stop at 11 am.

What time will all three buses next be at the bus stop.

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

$= 420$

420 mins = 7 hours

6 pm

(Total for Question 22 is 3 marks)

23 The table gives information about the times taken, in seconds, by 20 students to run a race.

Time (t seconds)	Midpoint		Frequency	MP x f
$20 < t \leq 25$	22.5	x	2	45
$25 < t \leq 30$	27.5	x	10	275
$30 < t \leq 35$	32.5	x	5	162.5
$35 < t \leq 45$	40	x	3	120
				602.5

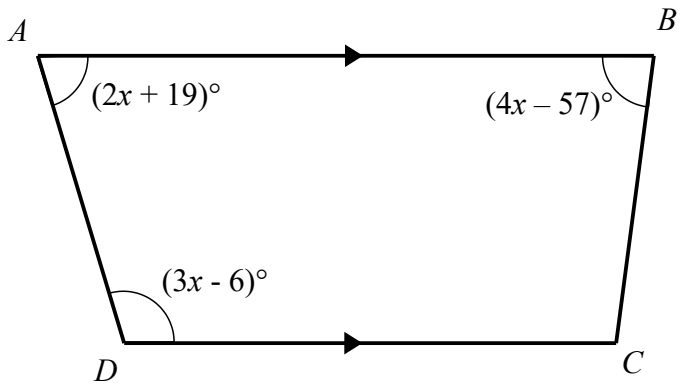
Work out an estimate for the mean time.

602.5 ÷ 20 = 30.125

30.1 seconds

(Total for Question 23 is 3 marks)

24 *ABCD* is a trapezium.



AB is parallel to *DC*
Find the size of angle *BCD*.

Co interior angles add to 180°

$2x + 19 + 3x - 6 = 180$

$5x + 13 = 180$

$5x = 167$

$x = 33.4$

$4(33.4) - 57 = 76.6$ (Angle ABC)

$180 - 76.6 = 103.4$ (BCD)

103.4 °

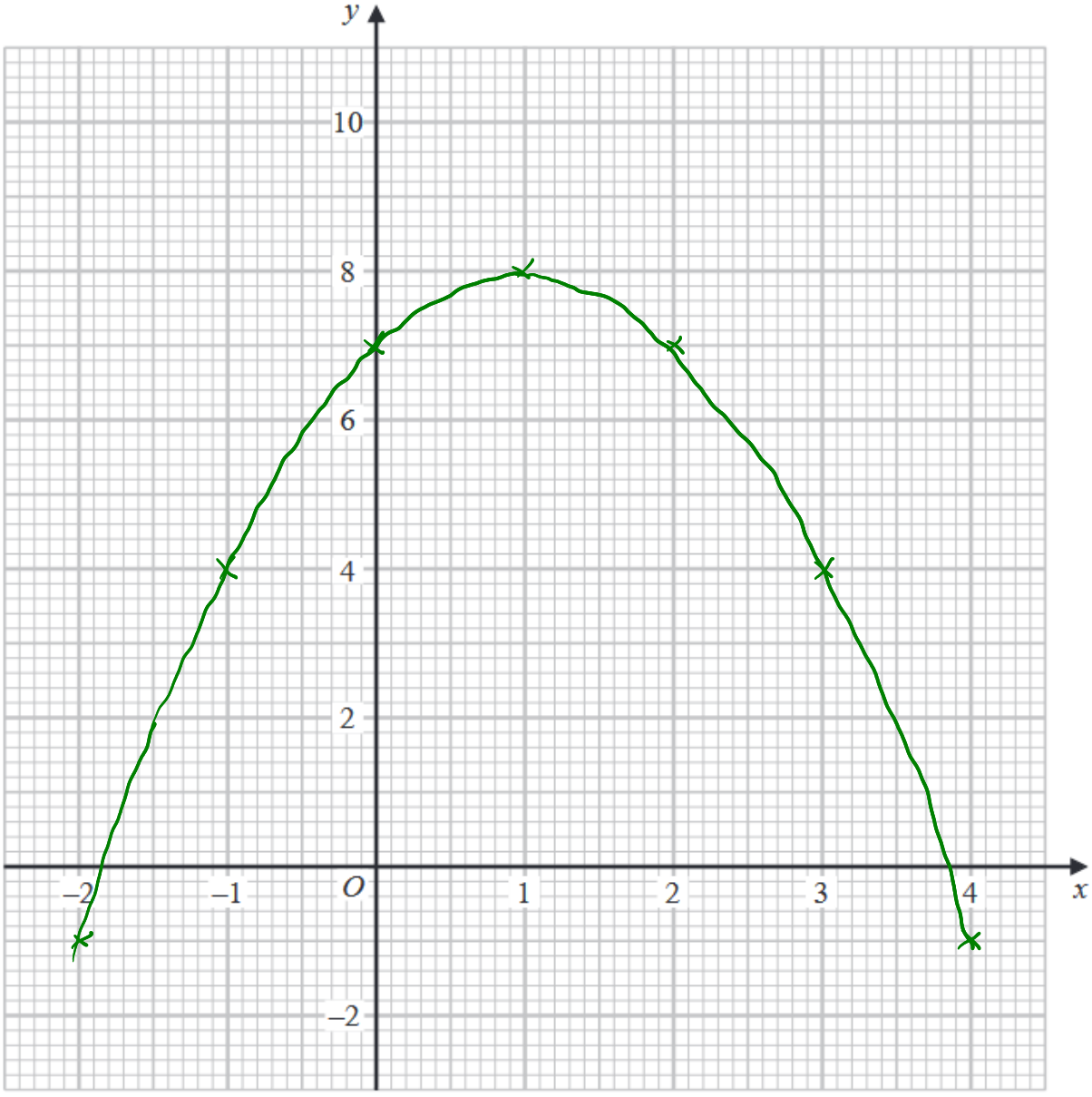
(Total for Question 24 is 4 marks)

25 (a) Complete the table of values for $y = 7 + 2x - x^2$

x	-2	-1	0	1	2	3	4
y	-1	4	7	8	7	4	-1

(2)

(b) On the grid, draw the graph of $y = 7 + 2x - x^2$ for values of x from –2 to 4



(c) Use your graph to find estimates of the solutions of the equation $7 + 2x - x^2 = 0$

-1.8 and 3.8

(2)

(Total for Question 25 is 6 marks)

or -1.9 and 3.9

26 Josh drove 39 miles from Luton to Cambridge.
He then drove 63 miles from Cambridge to Norwich.

$S = \frac{d}{t}$

Josh's average speed from Luton to Cambridge was 32 miles per hour
Josh took 80 minutes to drive from Cambridge to Norwich.

Work out Josh's average speed for his total drive from Luton to Norwich.

L → C

distance = 39 miles

speed = 32 m/h

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

$= \frac{39}{32} = 1.21875$

C → N

80 mins

$\frac{80}{60} = \frac{4}{3}$ or $1.\dot{3}$ hours

Total time

$\frac{39}{32} + \frac{4}{3} = 2.552\ldots$

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

$= \frac{39 + 63}{2.552\ldots} = 39.967\ldots$

40.0 miles per hour

(Total for Question 26 is 4 marks)

27 Milly invests £2000 in a savings account for 4 years.
She gets 3.9% per year compound interest.

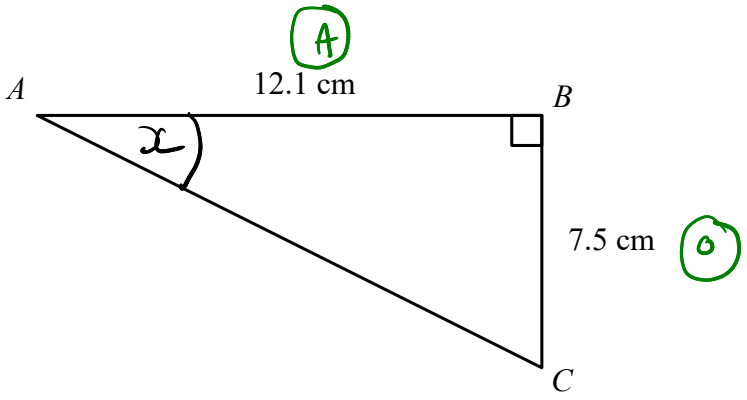
Work out how much money Milly will have in her savings account at the end of 4 years.
Give your answer correct to the nearest pound.

$2000 \times 1.039^4 = 2330.73$

£ 2331

(Total for Question 27 is 3 marks)

28



A

TOA

O

Work out the size of angle *BAC*.
Give your answer correct to 3 significant figures.

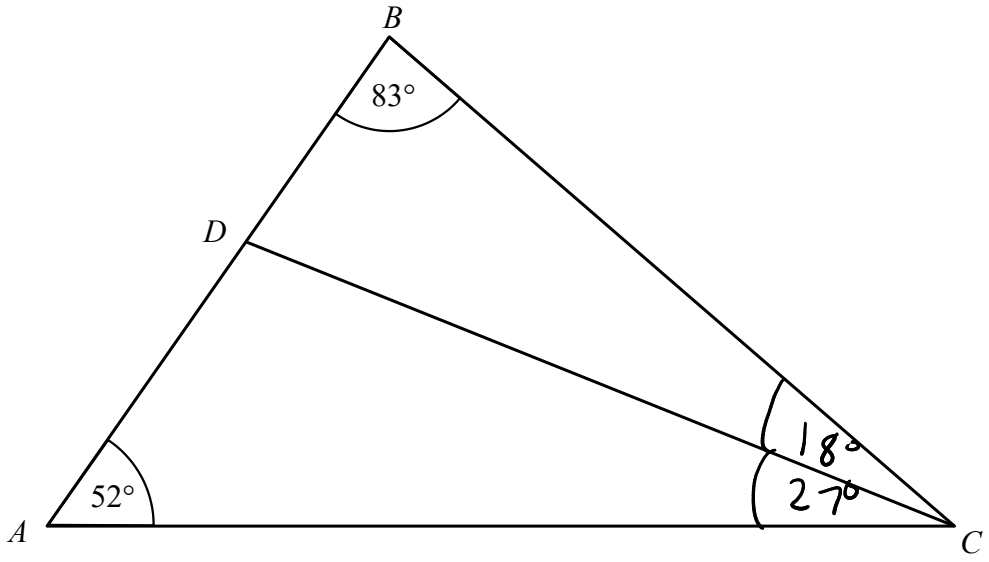
$\tan x = \frac{7.5}{12.1}$

$x = \tan^{-1}\left(\frac{7.5}{12.1}\right)$

31.8 °

(Total for Question 28 is 2 marks)

29 The diagram shows triangle *ABC*.



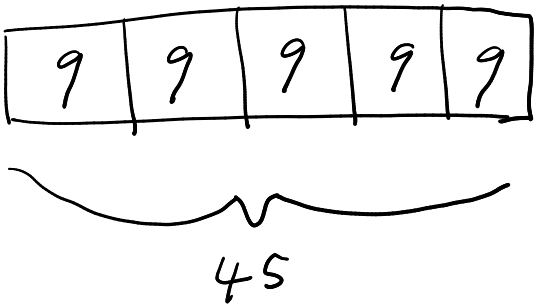
ADB is a straight line.

the size of angle *BCD* : the size of angle ACD = 2 : 3

Work out the size of angle *ADC*.

$180 - 52 - 83 = 45$

$\frac{45}{5} = 9$



$2 \times 9 = 18$

$3 \times 9 = 27$

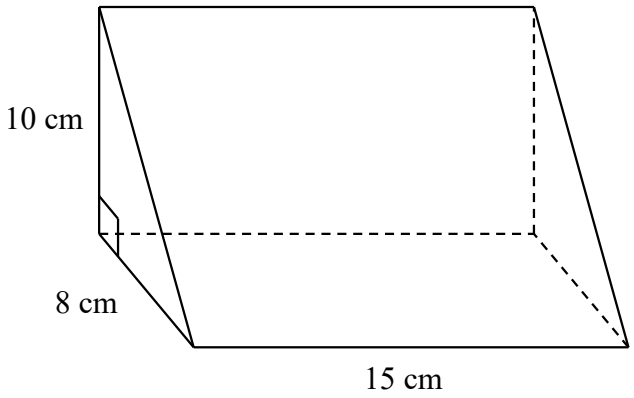
$ADC = 180 - 27 - 52$

$= 101$

101 °

(Total for Question 29 is 4 marks)

30 The diagram shows a solid triangular prism.



The prism is made from wood with a density of 0.6 g/cm³
Work out the mass of this prism.

volume = area of cross section × length

area = $\frac{1}{2}$ × 8 × 10
= 40 cm²

volume = 40 × 15
= 600 cm³

density = $\frac{\text{mass}}{\text{volume}}$

0.6 = $\frac{\text{mass}}{600}$

mass = 360 g

360 g

(Total for Question 30 is 3 marks)