1

(a) Complete this statement.

The diagram has rotational symmetry of order .... [1]

(b) On the diagram, draw all the lines of symmetry. [2]

2 Sahil and Anika share $78 in the ratio 5 : 8.

Calculate the amount each receives.

Sahil $ ....

Anika $ .... [2]

3 The number of passengers on a bus is recorded each day for 14 days.

| 15 | 18 | 22 | 17 | 35 | 38 | 24 |
| 19 | 19 | 24 | 25 | 31 | 36 | 29 |

(a) Complete the stem-and-leaf diagram.

1	
2	
3	

Key: 1│5   represents 15 passengers

[2]

(b) Find the median.

.... [1]
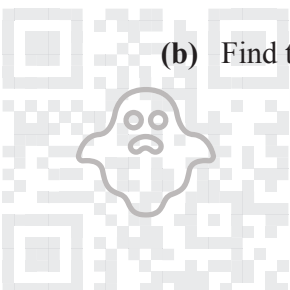
4   By writing each number correct to 1 significant figure, find an estimate for the value of

$$\frac{2.8 \times 82.6}{27.8 - 13.9}.$$

.... [2]

5   The number of bowls of hot soup sold decreases when the temperature rises.

What type of correlation does this statement describe?

.... [1]

6   Joseph spends $\frac{5}{24}$ of one week's earnings to buy a jacket.
The cost of the jacket is $56.50 .

Calculate the amount Joseph earns in a week.

$ .... [2]

7   **Without using a calculator,** work out $2\frac{1}{4} \times 3\frac{2}{3}$.

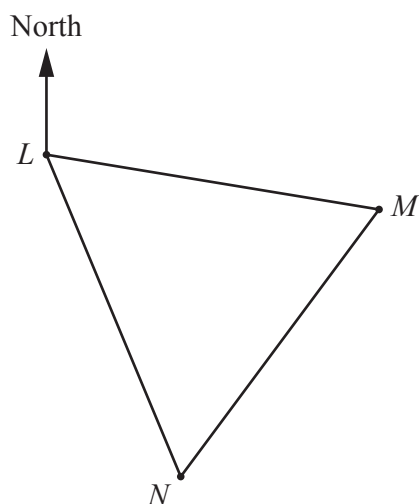You must show all your working and give your answer as a mixed number in its simplest form.

.... [3]

8 Write $0.3\dot{7}$ as a fraction.

.... [1]

9 Calculate $4.8 \times 10^6 + 3.7 \times 10^7$.
Give your answer in standard form.

.... [1]

10

North

L

M

NOT TO
SCALE

N

On a map, the positions of the towns *L*, *M* and *N* form an equilateral triangle.
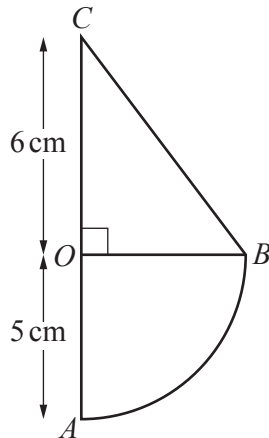The bearing of *M* from *L* is 103°.

Work out the bearing of *L* from *N*.

.... [2]

11 Find the highest common factor (HCF) of 36 and 84.

.... [2]

12

The diagram shows a shape made from a quarter-circle, *OAB*, and a right-angled triangle *OBC*.
The radius of the circle is 5 cm and *OC* = 6 cm.

Calculate the area of the shape.

.... cm^2 [3]

13 The population of one variety of butterfly is decreasing exponentially at a rate of 34% per year.
At the end of 2014, the population was 125.9 million.

Calculate the population at the end of 2019.

.... million [2]

14 (a) These are the first four terms of a sequence.

$$29 \qquad 22 \qquad 15 \qquad 8$$

Write down the next two terms.

.... , ... [2]

(b) These are the first five terms of another sequence.

$$4 \qquad 7 \qquad 12 \qquad 19 \qquad 28$$

Find the nth term.

.... [2]
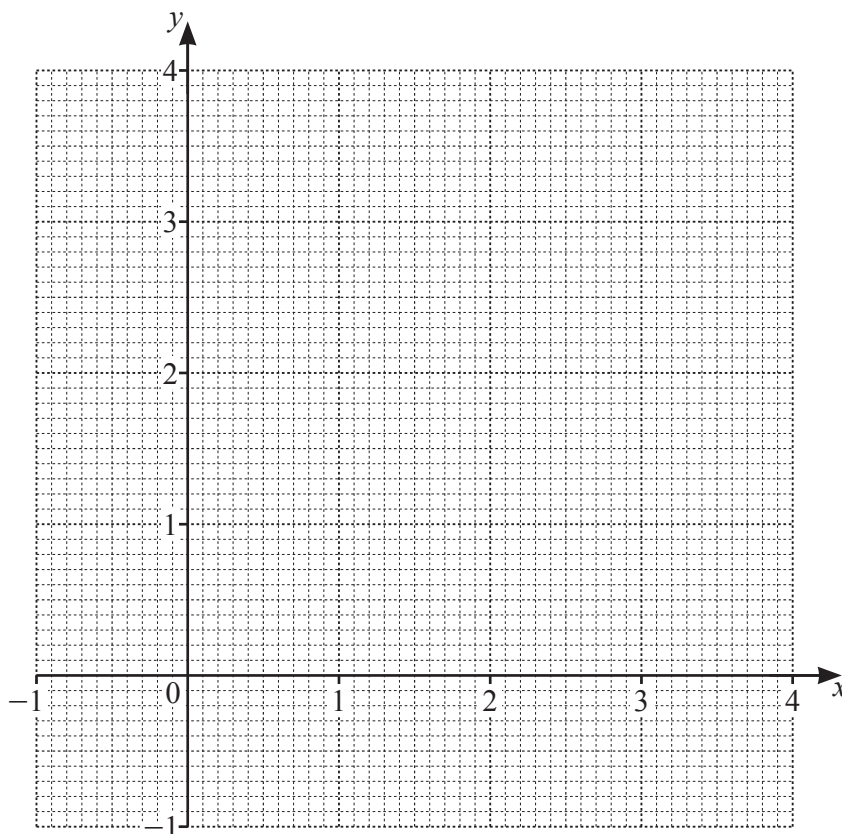
15
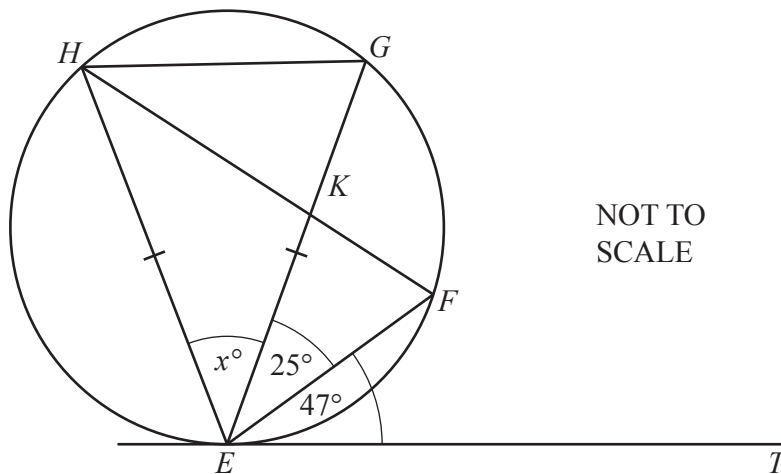
Points E, F, G and H lie on the circle and $EG = EH$.
HF and EG intersect at K.
ET is a tangent to the circle at E.
Angle $FET = 47°$ and angle $FEG = 25°$.

Find the value of x.

$x =$ .... [2]

16

The region R satisfies these three inequalities.

$$y > 1 \qquad y < 2x+2 \qquad x+y \leqslant 3$$

By drawing three suitable lines, and shading unwanted regions, find and label the region R.   [5]

17   Some students were asked how many books they each had in their school bags.
The table shows some of this information.

Number of books	5	6	7	8	9	10
Frequency	4	5	x	11	7	5

The mean number of books is 7.6 .

Calculate the value of x.

$x =$ .... [3]

18 Simplify $\left(343x^9\right)^{\frac{2}{3}}$.

.... [2]

19 Solve the simultaneous equations.
You must show all your working.

$$x - y = 7$$
$$x^2 + y = 149$$

$x =$ .... $y =$ ....

$x =$ .... $y =$ .... [5]

20 (a)

NOT TO SCALE
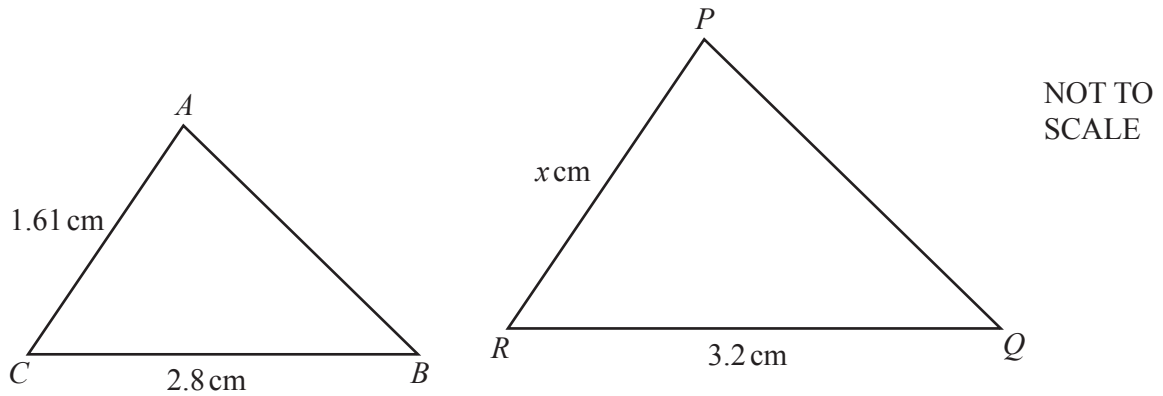
Triangle *ABC* is mathematically similar to triangle *PQR*.

Find the value of *x*.

$x =$ .... [2]

(b)

NOT TO SCALE
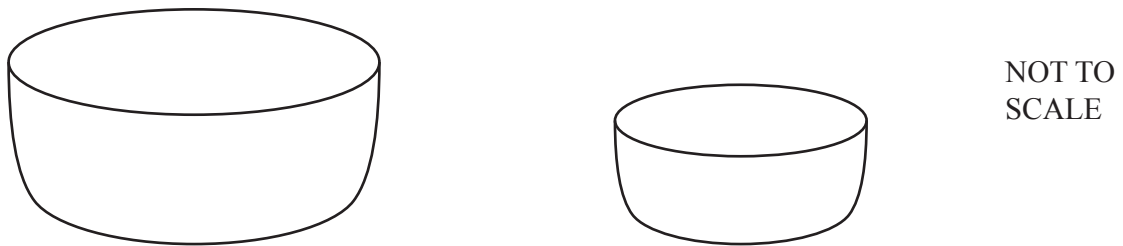
The diagram shows two mathematically similar bowls.
The larger bowl has capacity 7.8 litres and height 11.5 cm.
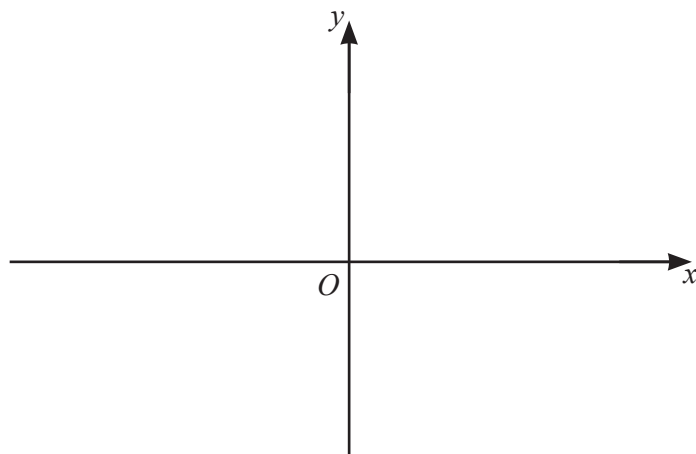The smaller bowl has capacity 4 litres.

Calculate the height of the smaller bowl.

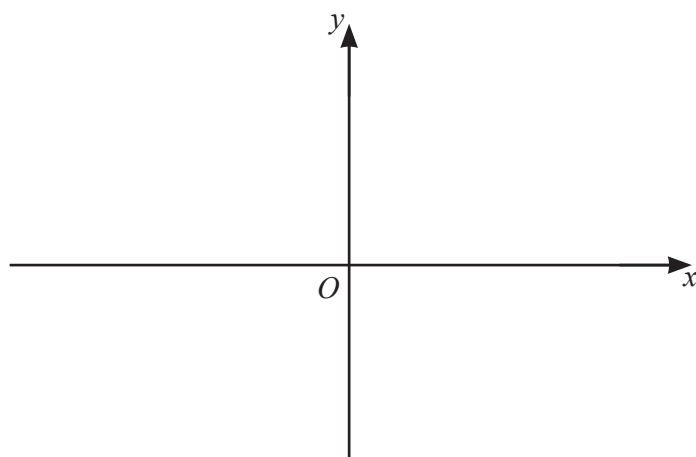... cm [3]

21 On the axes, sketch the graph of each of these functions.

(a) $y = \dfrac{1}{x}$

[2]

(b) $y = 4^x$

[2]

22 (a) A bag of rice has a mass of 25 kg, correct to the nearest kilogram.

Calculate the lower bound of the total mass of 10 of these bags.

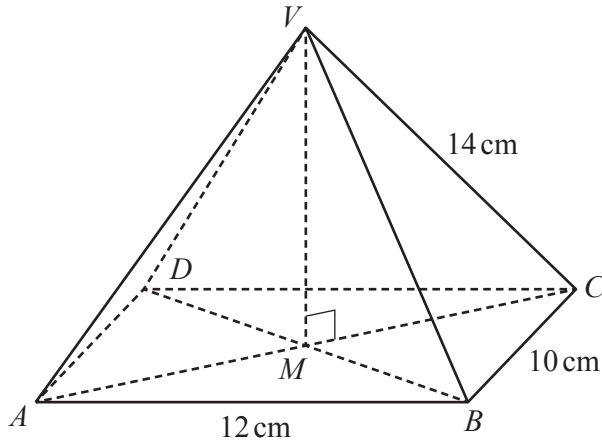... kg [1]

(b) Virat has 200 metres of wire, correct to the nearest metre.
He cuts the wire into n pieces of length 3 metres, correct to the nearest 20 centimetres.

Calculate the largest possible value of n.

$n = $ .... [3]

23

14 cm

NOT TO
SCALE

V

D

C

M

10 cm

A

12 cm

B

The diagram shows a pyramid $VABCD$ with a rectangular base.
V is vertically above M, the intersection of the diagonals AC and BD.
$AB = 12$ cm, $BC = 10$ cm and $VC = 14$ cm.

Calculate the angle that VC makes with the base $ABCD$.

.... [4]

24 A curve has equation $y = x^3 - 2x^2 + 5$.

Find the coordinates of its two stationary points.

(............. , ...) and (............. , ...) [5]