



Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

GCSE MATHEMATICS

F

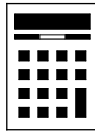
Foundation Tier Paper 3 Calculator

Monday 11 November 2019 Afternoon Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

- a calculator
- mathematical instruments.



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.

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	
TOTAL	

Advice

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



N 0 V 1 9 8 3 0 0 3 F 0 1

Answer **all** questions in the spaces provided

- 1 On a circle, which of these is **not** a straight line?
Circle your answer.

[1 mark]

circumference

radius

chord

diameter

- 2 Circle the expression that can be written as $3cd$

[1 mark]

$3 + c + d$

$c + c + c + d$

$c \times c \times c \times d$

$3 \times c \times d$

- 3 Which two numbers, when added together, make a cube number?
Circle your answer.

[1 mark]

1 and 8

2 and 4

9 and 18

8 and 64



- 4 Convert $2\frac{1}{2}$ kilograms into grams.

Circle your answer. $2.5 \times 1000 = 2500 \text{ g}$

25 grams

250 grams

2500 grams

25 000 grams

[1 mark]

- 5 (a) Convert $\frac{47}{8}$ to a mixed number.

$$\frac{8}{8} + \frac{8}{8} + \frac{8}{8} + \frac{8}{8} + \frac{8}{8} + \frac{7}{8}$$

[1 mark]

Answer

$$5\frac{7}{8}$$

- 5 (b) Convert $\frac{61}{128}$ to a decimal.

Give your answer to 2 decimal places.

[2 marks]

$$0.476 \dots$$

$$= 0.48 \text{ (2 d.p.)}$$

Answer

$$0.48$$



- 6 George buys some food for £16.55
He pays the exact amount with two notes and four coins.

List the notes and coins.

[2 marks]

Notes £10 £5 (2)

Coins 50 p 50 p 50 p 5 p

- 7 Choose **one** of the following to make a correct statement each time.

[4 marks]

is less than

is equal to

is greater than

When $a = 3$ $4a = 12$ is greater than (1) $10 = a + 7$

When $b = 8$ $2b - 6 = 10$ is equal to (1) $10 = 18 - b$

When $c = 0.5$ $3c = 1.5$ is equal to (1) $1.5 = c + 1$

When $d = -1$ $d = -1$ is less than (1) $1 = d^2$



- 8 Write down **all** the whole numbers that
are between 20 and 50
and
have a difference of 4 between their digits.

[2 marks]

26, 37, 40, 48

Answer 26, 37, 40, 48 (2)

- 9 (a) Rearrange $m = p + 2$ to make p the subject.

[1 mark]

$p = m - 2$

Answer $p = m - 2$ (1)

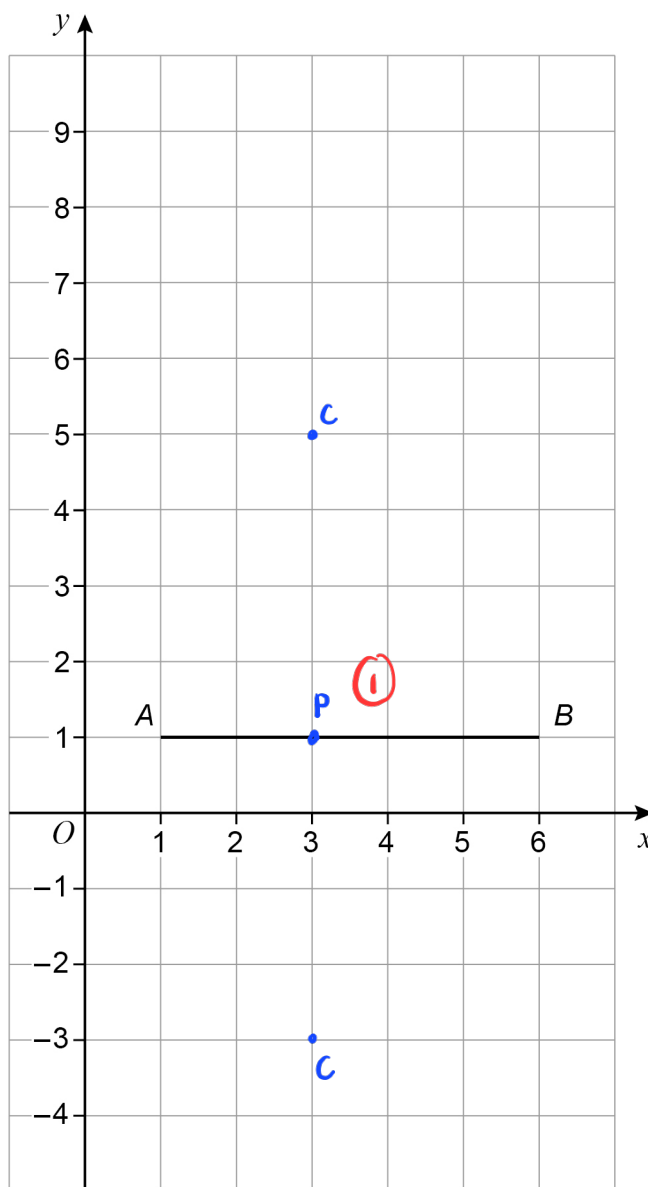
- 9 (b) Simplify $5x^2 - x^2$

[1 mark]

Answer $4x^2$ (1)



10 A line joins $A(1, 1)$ and $B(6, 1)$ on a centimetre grid.



P is a point on the line AB such that

$$AP : PB = 2 : 3$$

C is a point such that

angle APC is 90°

and

$$PC = 4 \text{ cm}$$

Write down the coordinates of the **two** possible points for C .

[3 marks]

Answer (3 , 5) and (3 , -3)



- 11 At a school there are six lessons in a day.
In total, the six lessons last for five hours.

- 11 (a) Assume that each lesson lasts the same amount of time.
How many minutes long is the final lesson?

[2 marks]

$$5 \text{ hours} \times 60 = 300 \text{ minutes}$$

(1)

$$300 \text{ mins} \div 6 = 50 \text{ minutes}$$

Answer 50 (1) minutes

- 11 (b) In fact, the first lesson of the day lasts longer than the other lessons.
The other lessons last the same amount of time.

What does this tell you about the length of the final lesson?

Tick **one** box.

[1 mark]

(1)

It is shorter than the answer to part (a)

It is the same as the answer to part (a)

It is longer than the answer to part (a)



- 12 A bottle contains 1.5 litres of water.
650 millilitres of the water is poured into a jug.
How much water is left in the bottle?
State the units of your answer.

[3 marks]

$$1.5 \times 1000 = 1500 \text{ millilitres} \quad (1)$$

$$1500 - 650 = 850$$

(1)

Answer 850 millilitres (1)

- 13 The cost of 5 kg of potatoes is £3.20
The cost of $\frac{1}{2}$ kg of carrots is 29p

Work out the **total** cost of 12 kg of potatoes and $1\frac{1}{2}$ kg of carrots.

[3 marks]

$$\text{Potatoes: } \frac{12}{5} \times \text{£}3.20 = \text{£}7.68$$

$$\text{carrots: } 3 \times \text{£}0.29 = \text{£}0.87 \quad (1)$$

$$\text{Total: } \text{£}7.68 + \text{£}0.87 \quad (1)$$

$$= \text{£}8.55 \quad (1)$$

Answer £ 8.55



- 14 (a) The term-to-term rule for a sequence is

add 4 then divide by 2

The 1st term of the sequence is 36

Work out the 3rd term.

[2 marks]

$$\text{2nd term : } \frac{36+4}{2} = 20 \quad (1)$$

$$\text{3rd term : } \frac{20+4}{2} = 12$$

Answer 12 (1)

- 14 (b) The term-to-term rule for a different sequence is

divide by 3 then add 10

The 2nd term of this sequence is 60

Work out the 1st term.

[2 marks]

$$\text{let 1st term} = x \cdot \frac{x}{3} + 10 = 60 \quad (1)$$

$$x = (60 - 10) \cdot 3$$

$$= 150$$

Answer 150 (1)



- 15 The table shows the cost of hiring a concrete mixer for up to 5 days.

Number of days	1	2	3	4	5
Cost	£14	£24	£34	£44	£54

Eva hires the concrete mixer for 5 days.

She says,

“The rate is £14 per day because the cost for 1 day is £14”

Is she correct?

Give a reason for your answer.

[2 marks]

No. It is £10 per day after first day. (i)

- 16 x is a **negative** number.

Which statement is correct?

Tick **one** box.

[1 mark]

$x + 10$ is always positive

$x + 10$ is always negative

$x + 10$ cannot be zero

$x + 10$ could be positive or negative or zero



- 17 The table shows the number of films watched one week by 30 people.

Number of films	Frequency	
0	5	
1	9	
2	8	
3	6	
4	2	

Total = 30

- 17 (a) Write down the modal number of films watched.

[1 mark]

Answer 1 (1)

- 17 (b) Work out the mean number of films watched per person.

[3 marks]

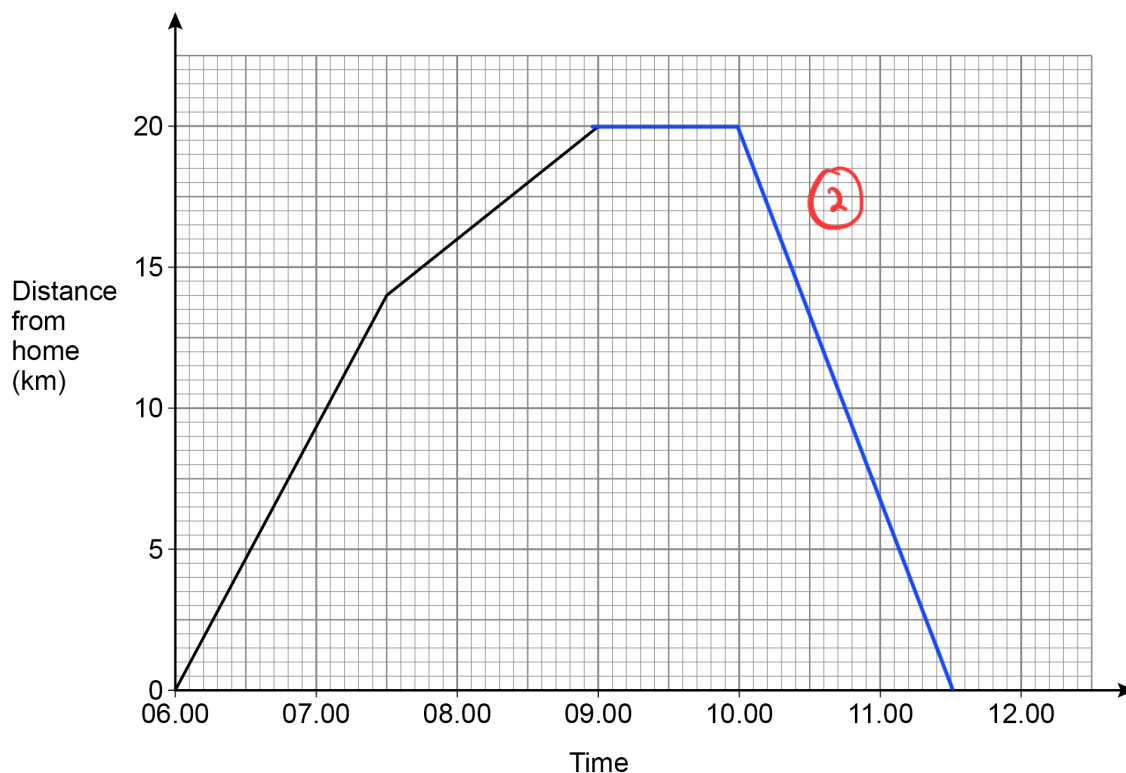
$$\text{mean} = \frac{(0 \times 5) + (1 \times 9) + (2 \times 8) + (3 \times 6) + (4 \times 2)}{30} \quad (1)$$

$$= \frac{0 + 9 + 16 + 18 + 8}{30} = \frac{51}{30} = 1.7 \quad (1)$$

Answer 1.7 (1)



- 18** Jenny leaves home at 06.00
 She runs for 3 hours.
 Here is a distance-time graph of her run.



- 18 (a)** How far from home is she after 3 hours?

[1 mark]

Answer 20 km

- 18 (b)** For the next hour she rests.
 She then gets a bus home.
 She arrives home at 11.30
 Complete the distance-time graph.
 Assume the bus travels at a constant speed.

[2 marks]

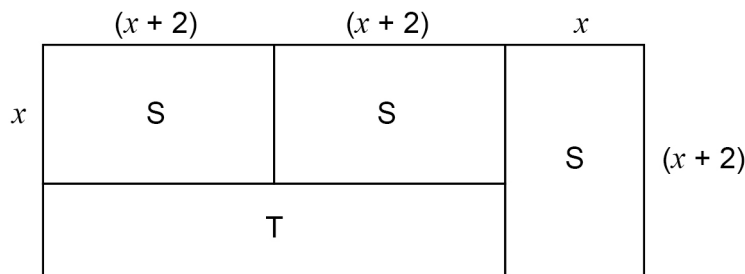


19

S and T are rectangles.

S has dimensions $(x + 2)$ and x .

Some of these rectangles make the larger rectangle shown.

Not drawn
accurately

Work out an expression for the perimeter of T.

Give your answer in its simplest form.

[3 marks]

$$\text{Perimeter of T} = 2(x+2+x+2) + 2(x+2-x)$$

$$= 2(2x+4) + 2(2)$$

$$= 4x+8+4$$

$$= 4x+12$$

$$= 4(x+3)$$

(3)

Answer $4(x+3)$

20

$$a : b = 7 : 1$$

Circle the correct equation.

[1 mark]

$$a = 7b$$

(1)

$$b = 7a$$

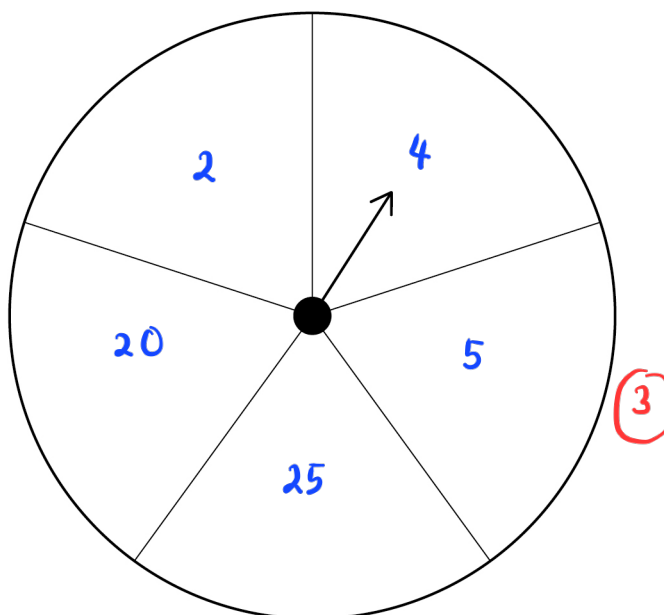
$$a = 6b$$

$$b = 6a$$

Turn over ►



- 21 A spinner has five equal sections.



Write a number in each section so that

the numbers are all different factors of 100

$$P(\text{single-digit number}) = \frac{3}{5}$$

$$P(\text{multiple of 25}) = \frac{1}{5}$$

[3 marks]

factors of 100 : 1, 2, 4, 5, 10, 20, 25, 50, 100

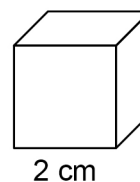
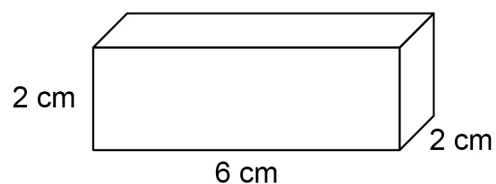
single digit no. : 1, 2, 4, 5

multiple of 25 : 25, 50, 100



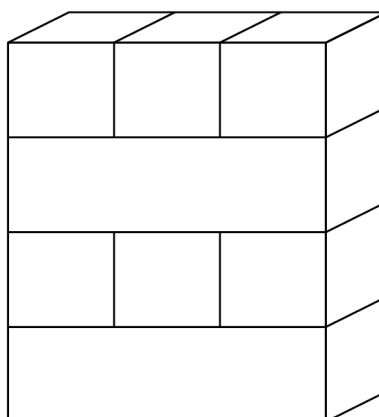
22

Here is a small cuboid and a cube.



Small cuboids and cubes are stacked in layers to make larger cuboids.

Here is a cuboid made with four layers.

The pattern is continued to make a cuboid with volume 336 cm^3 How many **cubes** are used?

[3 marks]

$$\text{Volume of 1 layer : } 2 \times 6 \times 2 = 24 \quad (1)$$

$$336 \div 24 = 14 \quad (1)$$

$$\text{Layers of cubes : } 14 \div 2 = 7$$

$$1 \text{ layer} = 3 \text{ cubes.}$$

$$\text{Total cubes : } 7 \times 3 = 21 \quad (1)$$

Answer 21

23 (a) Tom is tiling a wall.

He needs to buy at least 100 tiles.

The tiles are sold in large packs and small packs.

Large pack 40 tiles £18

Small pack 28 tiles £14

Special offer

25% reduction when you buy 3 or more **large** packs

Work out the cheapest cost for Tom to buy the packs of tiles he needs.

[3 marks]

[option 1] 3 large pack : $3 \times £18 = £54 \times 0.75 = £40.5$

[option 2]: 2 large pack, 1 small pack : $£18 + 18 + 14 = £50$

[option 3]: 4 small packs = $4 \times £14 = £56$

Answer £ 40.50



23 (b) Tom is also tiling a floor.

The floor is a rectangle with length 600 cm and width 240 cm

Each tile is a square with side 40 cm

Tom uses this method to work out the number of tiles he needs.

$$\begin{aligned} \text{Number of tiles that will fit along the length} &= 600 \div 40 \\ &= 15 \end{aligned}$$

$$\begin{aligned} \text{Number of tiles that will fit along the width} &= 240 \div 40 \\ &= 6 \end{aligned}$$

$$\begin{aligned} \text{Total number of tiles needed} &= 15 + 6 \\ &= 21 \end{aligned}$$

Give a reason why Tom's method is wrong.

[1 mark]

Should have multiplied 15 with 6, not added.



Turn over for the next question



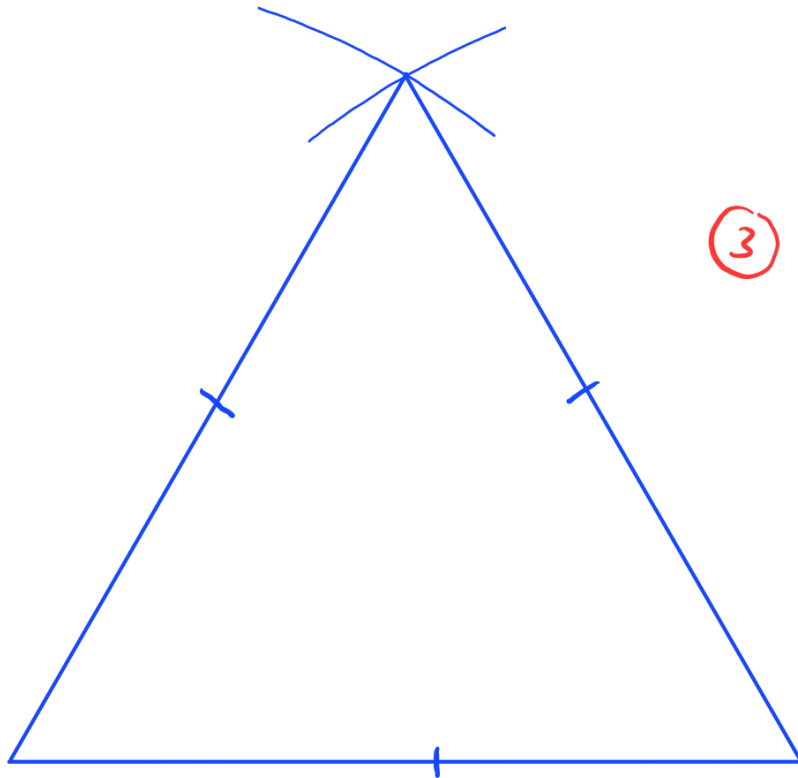
24 An equilateral triangle has side length 16 metres.

Using ruler and compasses only, construct a scale drawing of the triangle.

Use the scale 1 centimetre represents 2 metres.

[3 marks]

Scale: 1 cm represents 2 m



25 In a choir there are 35 men and 48 women.

The probability that a man chosen at random wears glasses is $\frac{2}{5}$

The probability that a woman chosen at random wears glasses is $\frac{3}{8}$

25 (a) Work out the number of people in the choir who wear glasses.

[3 marks]

$$\frac{2}{5} \times 35 = 14 \quad \frac{3}{8} \times 48 = 18 \quad (1)$$

$$14 + 18 = 32 \quad (1)$$

(1)

Answer 32

25 (b) A person is chosen at random from the choir.

Work out the probability that the person does **not** wear glasses.

[2 marks]

$$\text{Total men + women} = 35 + 48 = 83$$

$$\text{Not wearing glass} = 83 - 32 = 51 \quad (1)$$

$$P(\text{not wearing glass}) = \frac{51}{83} \quad (1)$$

Answer $\frac{51}{83}$



26

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

The mass is divided by 2 and the volume is multiplied by 4

What happens to the density?

Circle your answer.

[1 mark]

× 2

÷ 2

× 8

÷ 8 (1)

27

Solve the simultaneous equations

$$7x + 2y = 36 \quad - \textcircled{1}$$

$$3x + 2y = 16 \quad - \textcircled{2}$$

[3 marks]

$$\textcircled{1} - \textcircled{2} : 7x - 3x + 2y - 2y = 36 - 16$$

$$4x = 20 \quad \textcircled{1}$$

$$x = 5$$

$$7(5) + 2y = 36$$

$$2y = 36 - 35$$

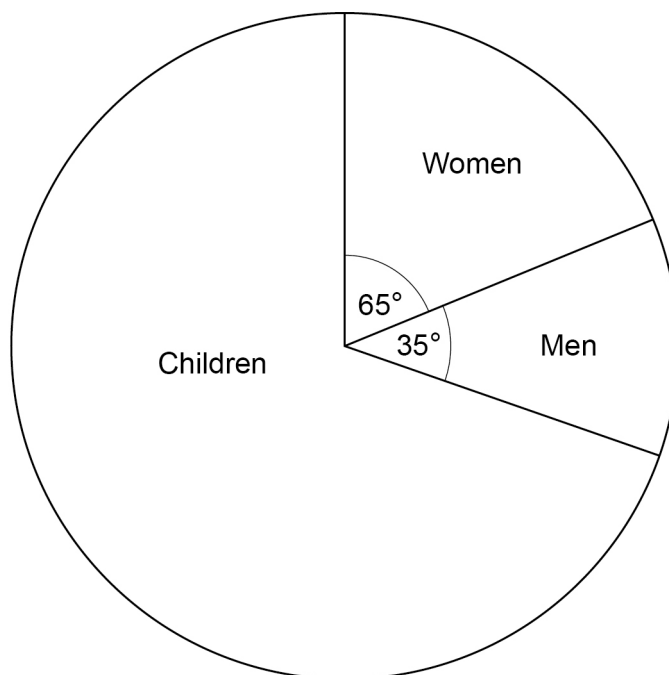
$$y = \frac{1}{2} \quad \textcircled{1}$$

$$x = \underline{5} \quad y = \underline{0.5}$$



28

The pie chart shows information about people at a theme park.

There were 450 **more** women than men.

Work out the number of children.

[3 marks]

$$65^\circ - 35^\circ = 30^\circ$$

$$30^\circ = 450 \quad (1)$$

$$\text{children} = 360^\circ - 65^\circ - 35^\circ = 260^\circ$$

$$\text{No. of children} = \frac{260^\circ}{30^\circ} \times 450 = 3900 \quad (1)$$

Answer 3900 (1)



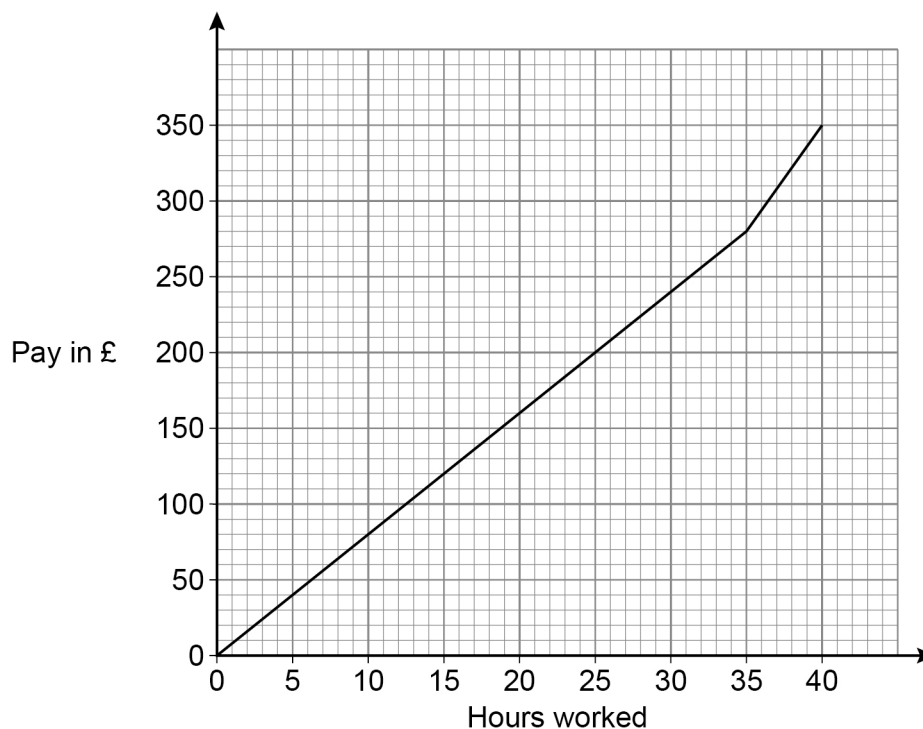
29

The graph shows how much Molly is paid for working for up to 40 hours.

She receives

a basic rate of pay for the first 35 hours worked

a higher rate of pay for the next 5 hours worked.



Work out the difference between the higher rate of pay and the basic rate of pay.

Give your answer in £ per hour.

[3 marks]

$$\text{Basic : } \frac{\pounds 280}{35 \text{ h}} = \pounds 8 \text{ per hour } \textcircled{1}$$

$$\text{Higher : } \frac{\pounds (350 - 280)}{5 \text{ h}} = \frac{\pounds 70}{5 \text{ h}} = \pounds 14 \text{ per hour } \textcircled{1}$$

$$14 - 8 = 6$$

Answer £ 6 $\textcircled{1}$ per hour



30

Work out

cube root of 512 : reciprocal of 0.4

Give your answer in the form $n : 1$

[3 marks]

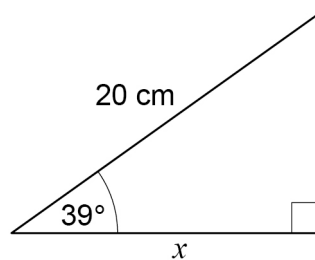
$$\sqrt[3]{512} = 8 \quad (1) \quad , \quad \frac{1}{0.4} = \frac{10}{4} = 2.5 \quad (1)$$

$$8 : 2.5$$

$$8 \div 2.5 = 3.2$$

Answer 3.2 (1) : 1

31

Use trigonometry to work out the value of x .Not drawn
accurately

[2 marks]

$$\cos 39^\circ = \frac{x}{20}$$

$$x = 20 \cos 39^\circ \quad (1)$$

$$= 15.54 \dots \quad (1)$$

Answer 15.5 cm

END OF QUESTIONS



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