OCR-F Nov'21 P2

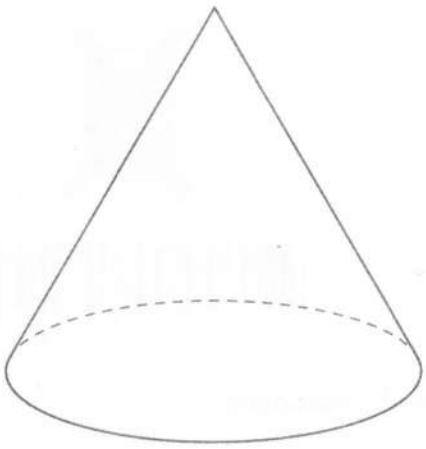
Answer **all** the questions.

1 **(a)** How many sides does a pentagon have?

5

(a) ..... [1]

(b) Write down the mathematical name of this solid.



cone

(b) ..... [1]

(c) The angles in a triangle are 40°, 50° and 90°.

Write down the mathematical name for this type of triangle.

right angled / scalene

(c) ..... [1]

2 Work out.

(a) $-7 + 10$

3

(a) ..... [1]

(b) 4×-2

-8

(b) ..... [1]

3 Work out.

(a) $9.06 \div 3$

$$3\overline{)9.06} \quad 3.02$$

(a) 3.02 ✓ [1]

(b) 15×0.6

$$\begin{array}{r} 15 \\ \times 0.6 \\ \hline 9.0 \end{array}$$

(b) 9 / 9.0 ✓ [2]

4 Use one of these symbols $<$, $>$ or $=$ to make each statement true.

(a) $\frac{1}{4}$ ..... $>$ ..... 0.025 ✓ [1]

(b) 0.304 ..... $<$ ..... 0.34 ✓ [1]

5 **(a)** Work out.

$4 + 16 \div 2$

$4 + 8$

(a) 12 ✓ [1]

(b) Insert one pair of brackets to make the calculation correct.

$(5 \times 7 + 1) \div 9 = 4$ ✓ [1]

6 In a quiz, Darcy answered 16 of the 20 questions correctly.

(a) What fraction of the questions did Darcy answer correctly?
Give your fraction in its lowest terms.

$\frac{16}{20} = \frac{8}{10}$ ✓

$\frac{4}{5}$ ✓

(a) ..... [2]

(b) Write the fraction as a decimal.

0.8 ✓

(b) ..... [1]

7 (a) Write $\frac{13}{3}$ as a mixed number.

$13 \div 3 = 4$ r1

$4\frac{1}{3}$ ✓

(a) ..... [1]

(b) Work out.

(i) $\frac{1}{3} + \frac{4}{9}$

$\frac{3}{9} + \frac{4}{9}$

✓

$\frac{7}{9}$ ✓

(b)(i) ..... [2]

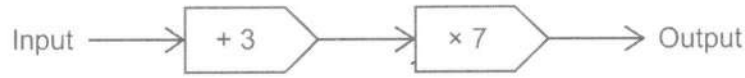
(ii) $3 \div \frac{1}{3}$

$\frac{3}{1} \times \frac{3}{1} = \frac{9}{1}$

9 ✓

(ii) ..... [1]

8 Here is a function.



(a) Find the output when the input is 2.

$2+3=5$ $5\times7=35$ ✓

(a) ..... [1]

(b) Find the input when the output is 63.

$63\div7=9$ ✓

$9-3=6$ ✓

(b) ..... [2]

9 A shopper buys 4 apples costing 60 p each and 3 peaches.
They pay with a £5 note and receive 44 p in change.
Each peach costs the same amount.

Work out the cost of one peach.
You must show your working.

$60\times4=240p$ ✓

$240+44=284$ ✓

3 peaches = $500-284=216$ ✓

$3\overline{)216}$ 72 ✓

72 ✓

..... p [5]

10 Ben and Sundip are making pancakes using the ingredients below.

Ingredients to make 12 pancakes
75 ml water
200 ml milk
100 g flour
50 g butter
2 eggs

(a) The ratio of the amount of water to the amount of milk needed is 75 : 200.

Write this ratio in its simplest form.

15 : 40 ✓ etc

3 : 8 ✓

(a) ..... : ..... **[2]**

(b) Ben makes 18 pancakes. ×1·5

Work out how much flour he needs.

100 × 1·5 ✓

150 ✓

(b) ..... g **[2]**

(c) Sundip has 225 g of butter and 10 eggs.
She has plenty of the other ingredients.

Work out the maximum number of pancakes that she can make.

B	E	P
50	2	12
100	4	24
150	6	36
200	8	48
~~250~~	10	60

225 → 54 ✓

(c) ..... **[4]**

M✓ M✓ ✓

11 Ali (A), Blake (B), Rowan (R) and Sam (S) are in a relay team.
Sam always runs fourth in the team.
The order for the other three is chosen at random.

(a) Complete this table to show all the possible orders for the team.
The first row has been completed for you.
You may not need to use all the rows.

First	Second	Third	Fourth
A	B	R	S
A	R	B	S
R	A	B	S
R	B	A	S
B	A	R	S
B	R	A	S

✓ Any 3
✓✓ All

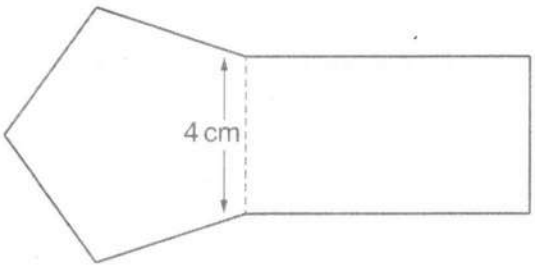
[2]

(b) Find the probability that Ali will run first.

✓ $\frac{2}{6}$ or $\frac{1}{3}$ etc
✓

(b) ..... **[2]**

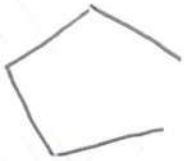
12 The shape below is formed by a rectangle of width 4 cm and a regular pentagon.
For the rectangle, the ratio of the width to the length is 2 : 5.



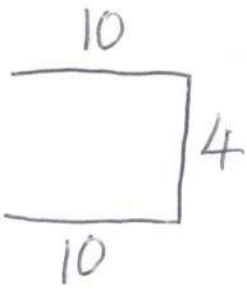
Not to scale

2 : 5
= 4 : 10 ✓

Work out the perimeter of the shape.



= 4 × 4 = 16 ✓



= 24 ✓

24 + 16 = 40 ✓

..... cm **[4]**

13 (a) Reece is given this question.

> Write 20 as a product of prime factors.
> Give your answer in index form.

Reece's answer is $2 \times 2 \times 5$.

Is Reece correct?
Explain your answer.

No, index form means $= 2^2 \times 5$ ✓

..... [1]

(b) Complete the power of 2.

$\frac{1}{8} = 2^{-3}$ ✓ [1]

(c) Work out.

$\sqrt{81} \times 2^3$

$= 9 \times 8$

✓ ✓

72 ✓

(c) ..... [3]

14 A car mechanic has a tin containing 5 litres of engine oil.
Each week they use 450 millilitres of this oil for their vehicles.

The car mechanic says

After 9 weeks I will have used over 80% of the oil in this tin.

Are they correct?
Show how you decide.

5 litres = 5000 ml ✓

10% = 500

80% = 4000ml ✓

450ml used

× 9 ✓

✓ 4050 ml over 9 weeks

Yes, correct as 4000ml < 4050ml ✓

..... [5]

15 Solve the inequality.

$2(x+5) < 16$

$x + 5 < 8$

$x < 3$

or

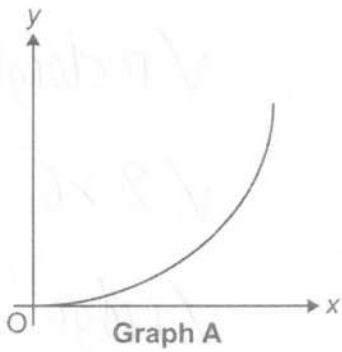
$2x + 10 < 16$ ✓

$2x < 6$ ✓

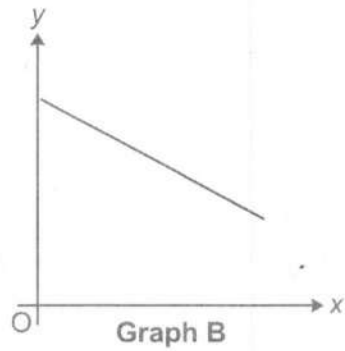
$x < 3$ ✓

..... **[3]**

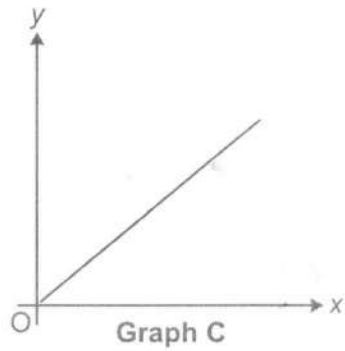
16 Here are sketches of five graphs.



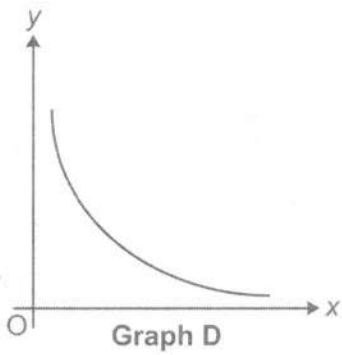
Graph A



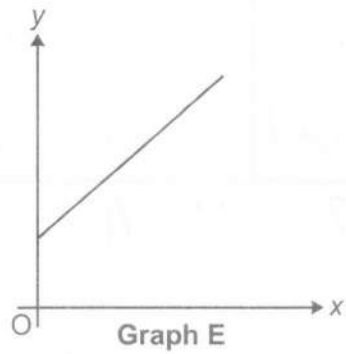
Graph B



Graph C



Graph D



Graph E

Write the letter of the graph that represents the following relationships.

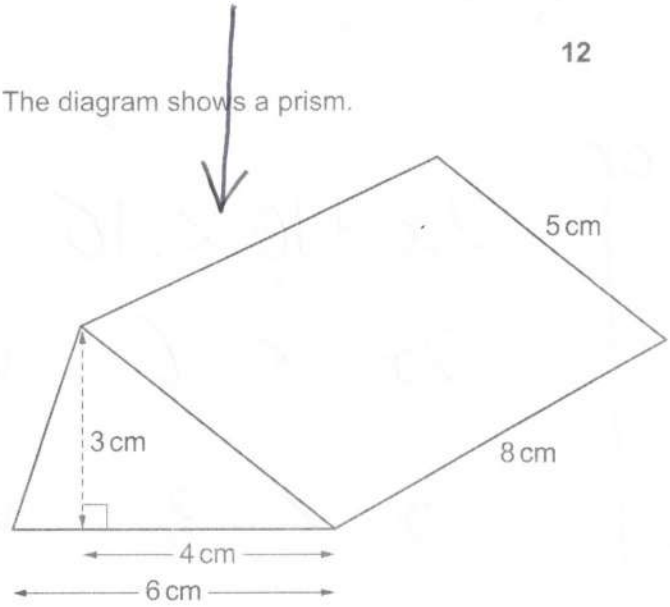
(a) y is directly proportional to x.

(a) C ✓ ..... **[1]**

(b) y is inversely proportional to x.

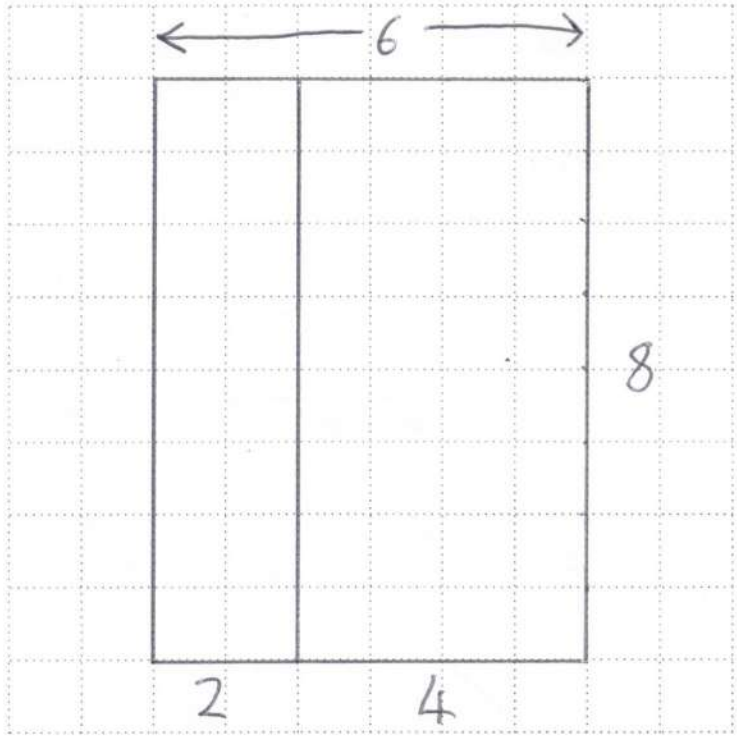
(b) D ✓ ..... **[1]**

17 The diagram shows a prism.



Not to scale

(a) Draw an accurate plan view of the prism on the one-centimetre square grid below.



✓ rectangle

✓ 8 x 6

✓ ridge

[3]

(b) Show that the volume of the prism is $72\,cm^3$. **[2]**

$= \frac{1}{2}bh = \frac{1}{2} \times 6 \times 3 = 9$ ✓

Vol = 9 x length

= 9 x 8 = $72\,cm^3$ ✓

(c) A cuboid with a square base also has a volume of $72\,cm^3$.
The height of the cuboid is 2 cm.

Work out the length of one side of the square base.

$72 \div 2 = 36$ ✓

$\sqrt{36}$ ✓

6 ✓

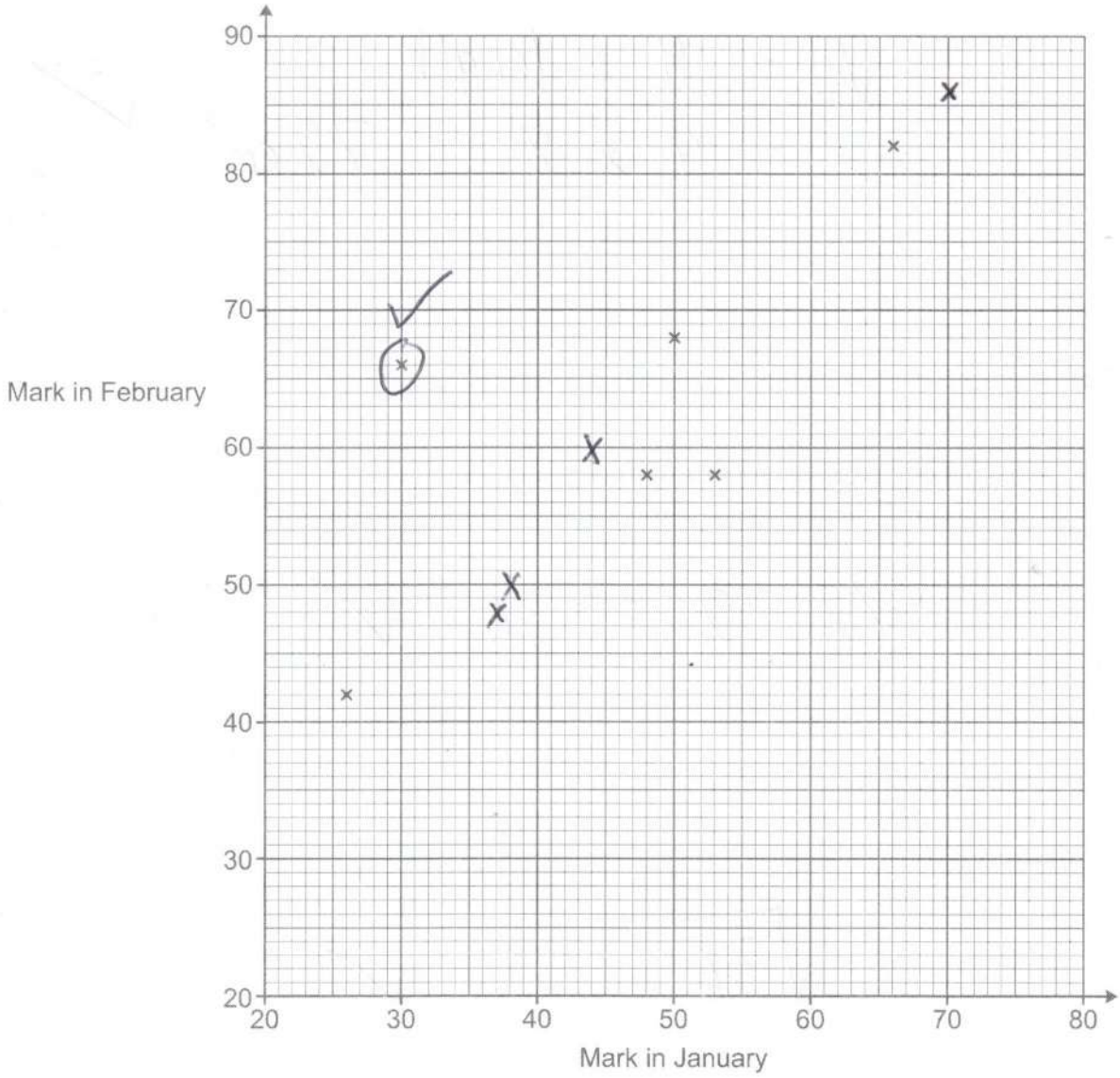
(c) ..... cm **[3]**

18 The table shows the marks obtained by 10 students in spelling tests in January and February.

Mark in January	26	53	50	48	30	66	70	44	37	38
Mark in February	42	58	68	58	66	82	86	60	48	50

x
y

The marks for the first six students are plotted on the scatter diagram.



(a) Plot the marks for the remaining four students. ✓2 ✓✓All **[2]**

(b) Describe the type of correlation shown in the completed scatter diagram.

positive ✓ **[1]**

(c) (i) On the scatter diagram, **circle** the student that made the greatest improvement in their marks from January to February. **[1]**

(ii) Work out the percentage change in this student's marks from January to February.

$$\frac{66-30}{30} \times 100 \quad \checkmark\checkmark$$

$$= \frac{36}{30} \times \frac{100}{1} = \frac{360}{3}$$

(c)(ii) 120 ✓ % **[3]**

(d) Another student, Kai, scored 79 marks in the test in January but was absent for the test in February.

Kai says

I could use a line of best fit on the scatter diagram to estimate the marks I may have achieved in the test in February.

Is Kai's method reliable?
Give a reason for your answer.

No, line of best fit is beyond the data provided. **[1]**

19 A worker received a 10% pay increase in 2017 and a further 10% pay increase in 2018.
The worker says

Over these two years, my pay increased by 10% + 10% = 20%.

The worker is incorrect.

Work out the correct percentage increase.
You must show your working.

100% x 1.1 = 110% ✓

110% x 1.1 = 121% ✓

✓

21% ✓

..... **[5]**

20 Force is measured in newtons (N).
A force of 198.5 N is applied to a rectangular surface of length 4.9 cm and width 4.1 cm.

Work out an **estimate** of the pressure, in N/cm^2, applied to this rectangular surface.

[The formula for pressure is: Pressure = $\frac{\text{Force}}{\text{Area}}$]

□ = 5 x 4 = 20 cm^2 ✓

$P = \frac{200}{20}$ ✓ ÷ ✓

10 ✓

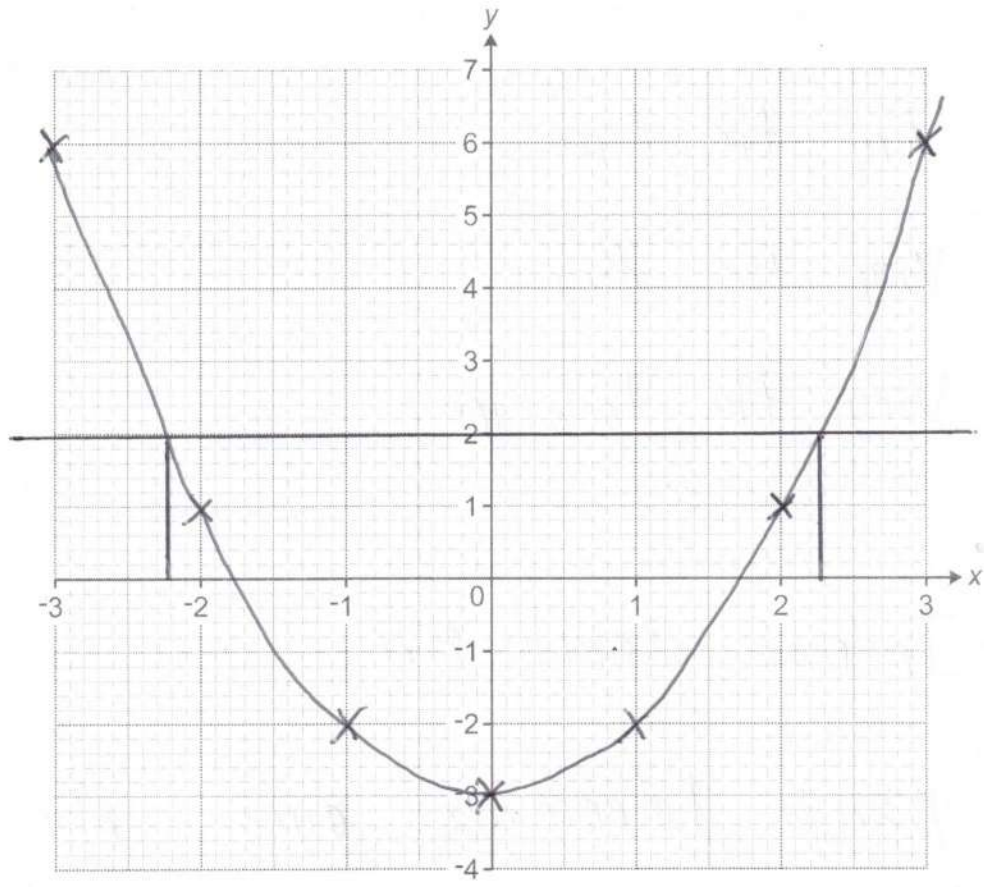
..... N/cm^2 **[4]**

21 **(a)** Complete this table for $y = x^2 - 3$. $0^2 - 3$

x	-3	-2	-1	0	1	2	3
y	6	1	-2	-3	-2	1	6

✓ ✓ [2]

(b) Draw the graph of $y = x^2 - 3$ for values of x from -3 to 3.



✓All
✓6
✓4

[3]

(c) Use your graph to solve $x^2 - 3 = 2$.

(c) $x =$ -2·2 or $x =$ 2·3 [2] ✓✓

MS [-2·3 → -2·2 / 2·2 → 2·3]
inclusive

22 A journalist is going to do a survey to find out whether people aged 15 or less spend more time playing computer games than people aged more than 15.

The journalist says their sample will be the first 20 people leaving a particular shop after 9 am next Monday.

(a) Give **one** reason why the journalist's sample is unlikely to give reliable information.

All could be adults ✓

..... [1]

(b) Make **three** suggestions to help the journalist obtain a sample that may give more reliable information.

1 Vary the time ✓

2 Vary the day ✓

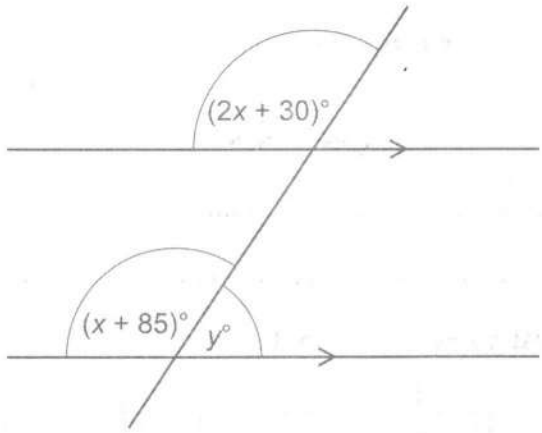
3 Vary the location ✓

..... [3]

- Increase sample size.

- Ensure balance of ages etc

23 The diagram shows a straight line crossing two parallel lines.



Not to scale

Find the value of y.
You must show your working.

$2x + 30 = x + 85$ ✓✓

$x = 55$ ✓

$y = 180 - 85 - 55$ ✓

$y =$ 40 ✓ **[6]**

END OF QUESTION PAPER