Mathematics

Practice Set A
Paper 1 (Non-Calculator)
Higher Tier

Time: 1 hour 30 minutes

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser.

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

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.

1 $\mathscr{E}$ = {even numbers between 1 and 31}
A = {2, 6, 8, 14, 18, 26, 28}
B = {8, 10, 16, 18, 24, 30}

(a) Complete the Venn diagram to represent this information.

$\mathscr{E}$

A B
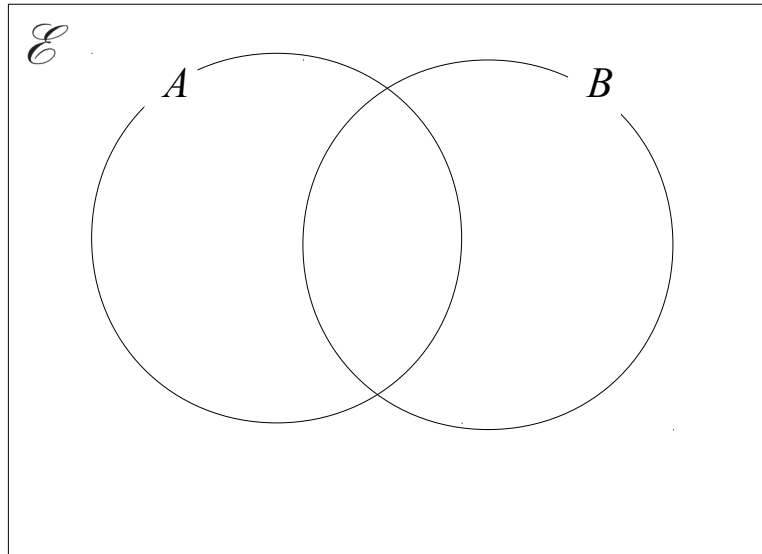
(2)

A number is chosen at random from the universal set, $\mathscr{E}$

(b) What is the probability that the number is in the set $A \cup B$?

…...…

(2)

(Total for Question 1 is 4 marks)

2   Alfie, Bertie and Charlie share £115
The amount Alfie and Bertie get is in the ratio 7:5
The amount Bertie and Charlie get is in the ratio 3:2

How much does Alfie get?

(Total for Question 2 is 3 marks)

3   (a) Work out $\dfrac{7}{8} \div \dfrac{2}{5}$

Give your answer as a mixed number in its simplest form.

....

(2)

(b) Work out $1\dfrac{3}{4} \times \dfrac{2}{5}$

....

(2)

(Total for Question 3 is 4 marks)

4 A circle has a radius of 32 mm.
    (a) Work out an estimate for the area of the circle.

.................................mm^2

(3)

    (b) Is your answer to part (a) an underestimate or an overestimate?
      Give a reason for your answer.

…..

…..

(1)

(Total for Question 4 is 4 marks)

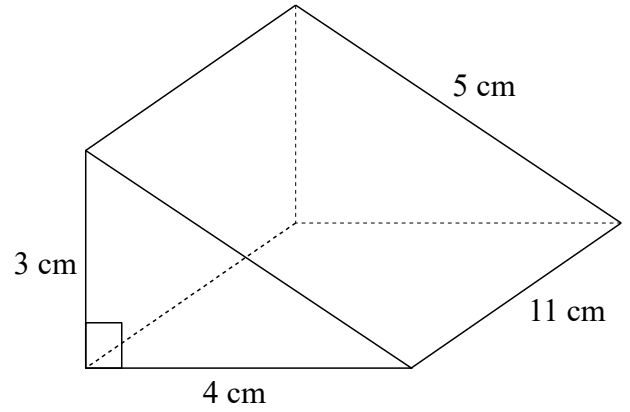**5** Lottie buys a pack of 30 cans of lemonade.
    She pays £10.50 for the cans.

    Lottie sells 22 of the cans for 50p each.
    She sells the remaining cans for 20p each.

    Work out Lottie's percentage profit.

…..................................…. %

(Total for Question 5 is 4 marks)

6   The diagram shows a triangular prism.

Find the total surface area of the triangular prism.

3 cm

5 cm

4 cm

11 cm

…….........…......................................
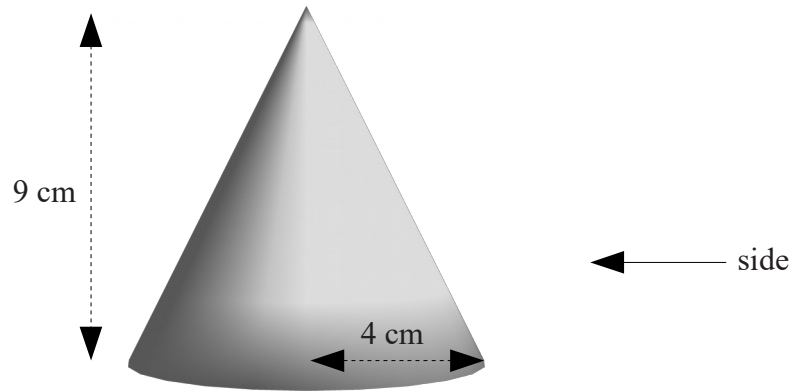
(Total for Question 6 is 4 marks)

7   Dani leaves her house at 08 00.
She drives 32 miles to work.
She drives at an average speed of 40 miles per hour.
At what time does Dani arrive at work?

....…

(Total for Question 7 is 3 marks)

8   The diagram shows a cone with radius 4 cm and perpendicular height of 9 cm
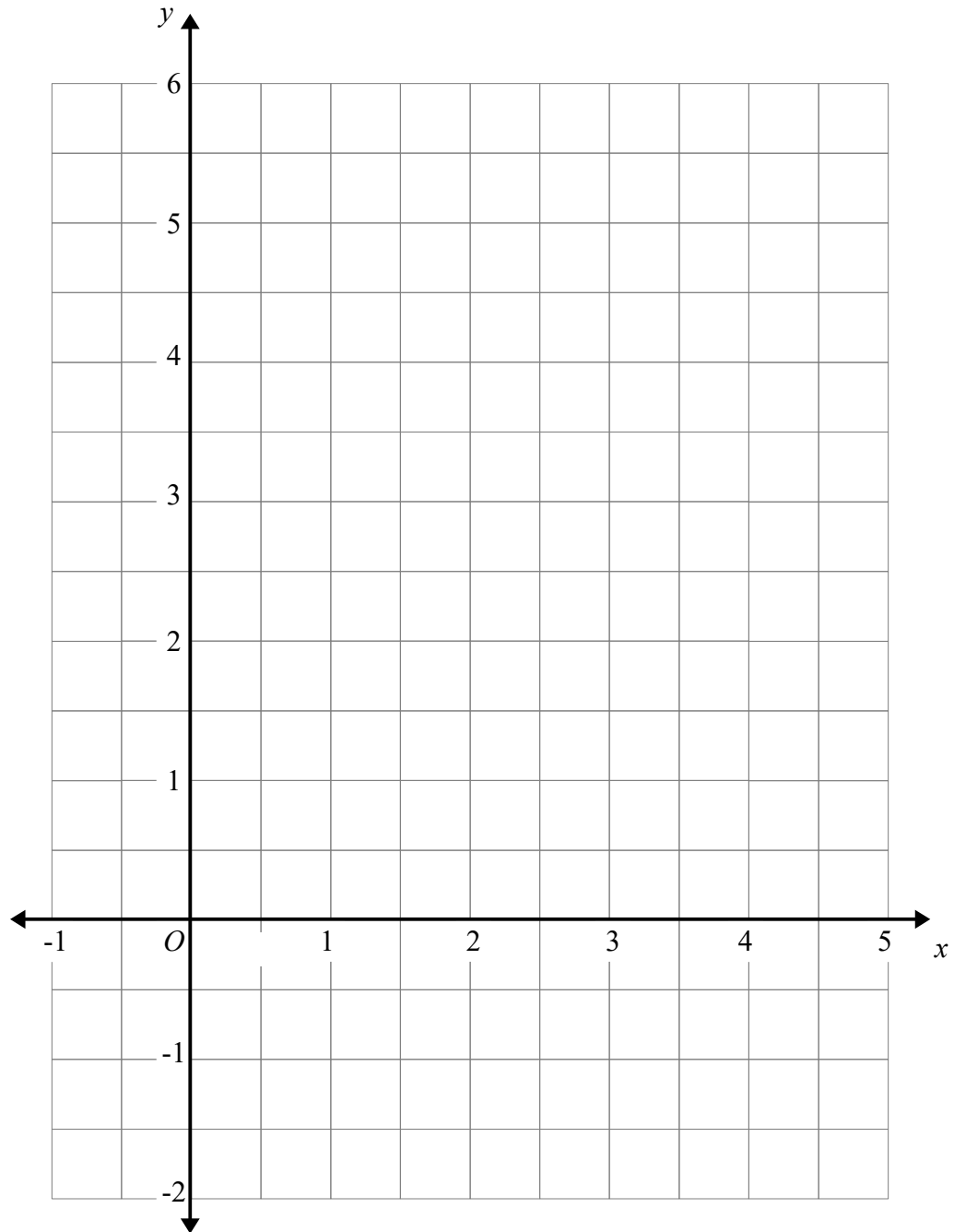

9 cm

side

4 cm

On the centimetre grid below, draw the plan and the side elevation of the cone.

(Total for Question 8 is 3 marks)

9 On the grid, draw the graph of $x + y = 4$ for x values from -1 to 5

10 $a = \begin{pmatrix} 4 \\ -3 \end{pmatrix}$ and $b = \begin{pmatrix} 5 \\ 1 \end{pmatrix}$
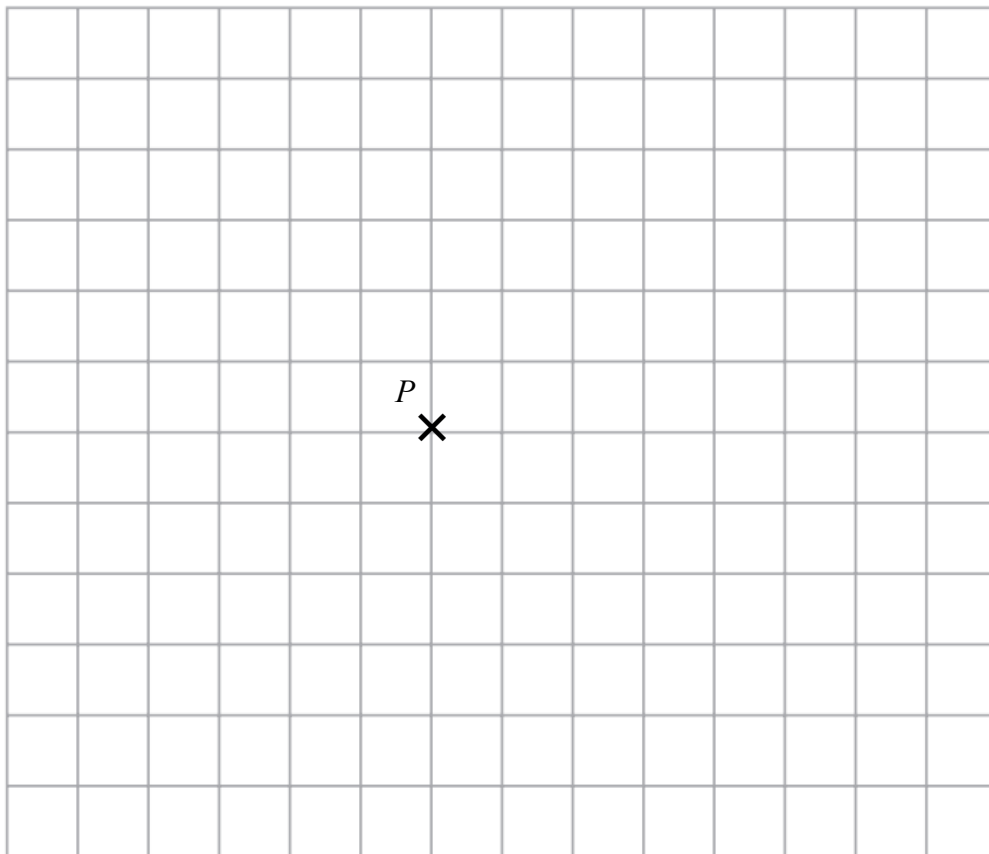
(a) Write down as a column vector

(i) **a** + **b**

....
(1)

(ii) 2**a** − **b**

....
(2)

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

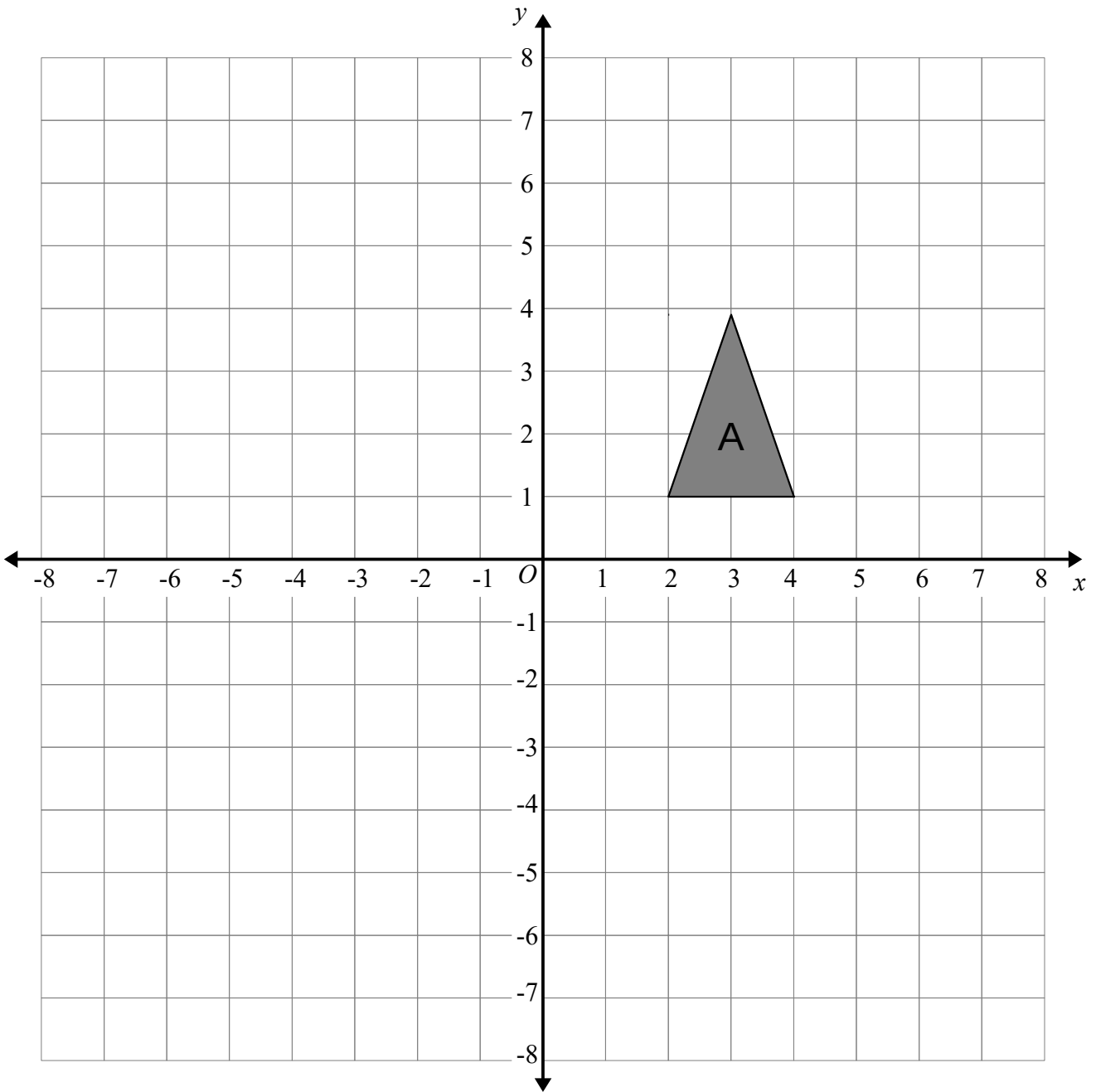(b) From the point P, draw the vector **c**

P
✗

(1)

(Total for Question 10 is 4 marks)

11

Shape A is reflected in the line $x = -1$ to give shape B.
Shape B is reflected in the line $y = -2$ to give shape C.

Describe the single transformation that will map shape A to shape C.

....

....

....

(Total for Question 11 is 2 marks)

12 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 $= 3 : 4$

A total of 144 chocolate bars were sold.

Work out the number of small chocolate bars sold.

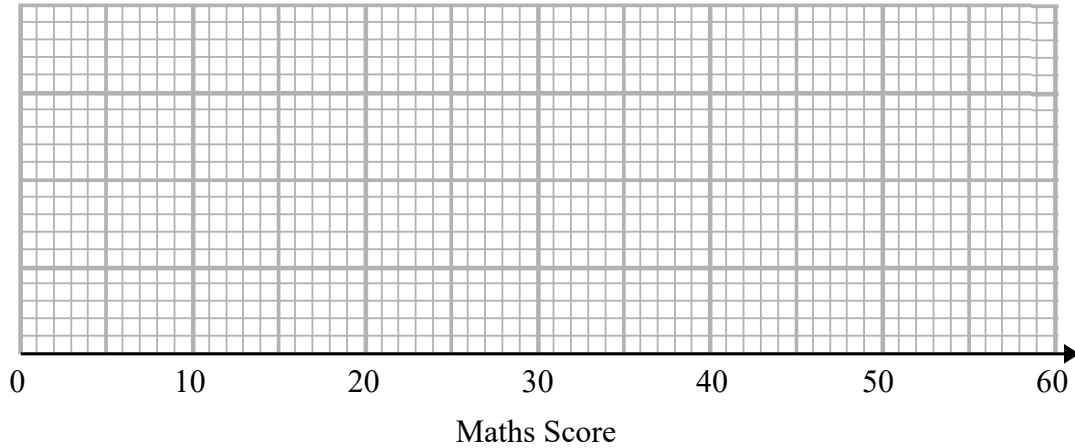..

(Total for Question 12 is 4 marks)

13 The table shows some information about the maths scores of students in class A.

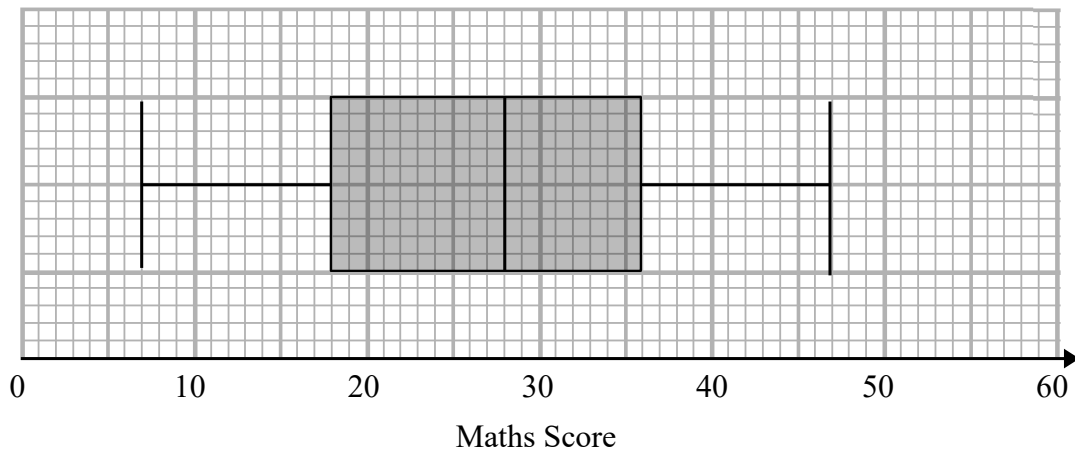| Minimum	Lower Quartile	Median	Upper Quartile	Maximum
7	15	23	42	51

(a) Draw a box plot for this information.

Maths Score

(3)

The box plot below shows the distribution of the maths scores of students in class B.

Maths Score

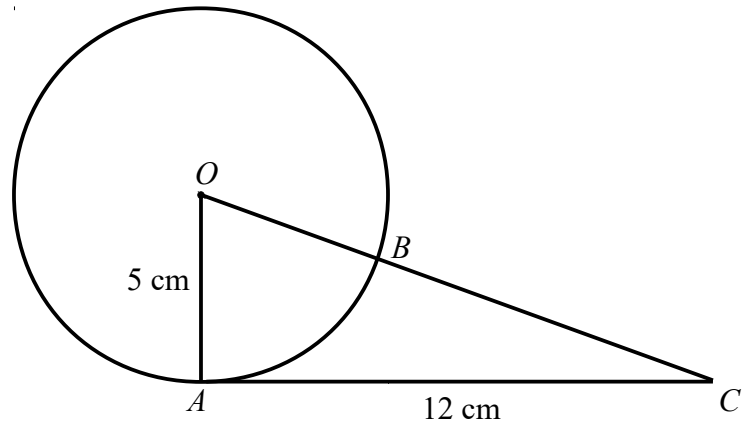(b) Compare the distribution of the maths scores of students in class A and class B.

…..

…..

…..

…..

(2)

(Total for Question 13 is 5 marks)

14

A and *B* is a point on the circumference of a circle, centre *O*.
AC is a tangent to the circle.
OBC is a straight line.

OA = 5 cm
AC = 12 cm

Find the length of *BC*.
You must show all your working.

.... cm

(Total for Question 14 is 4 marks)

15 (a) Find the value of 16^0

....
(1)

(b) Find the value of $81^{\frac{1}{2}}$

....
(1)

(c) Find the value of $27^{-\frac{2}{3}}$

....
(2)

(Total for Question 15 is 4 marks)

16 Prove that the sum of the squares of two consecutive odd numbers is always 2 more than a multiple of 8

(Total for Question 16 is 3 marks)

17 In a bag there are only red counters, blue counters, green counters and yellow counters.

A counter is taken at random from the bag.

The table shows the probabilities that the counter will be green or will be yellow.

Colour	Red	Blue	Green	Yellow
Probability			0.35	0.2

The ratio of red counters to the ratio of blue counters is 5 : 4

There are 21 green counters in the bag.

Work out the number of red counters in the bag.

18   Factorise $3x^2 + 10xy + 8y^2$

…….......…..

(Total for Question 18 is 2 marks)

19   Simplify fully $\dfrac{3x^2 + 9x}{2x^2 - 18}$

…….......…..

(Total for Question 19 is 2 marks)

20 y is inversely proportional to the cube of x

When $y = 160$, $x = 0.5$

Find the value of x when $y = 2.5$

$x =$ ....

(Total for Question 20 is 3 marks)

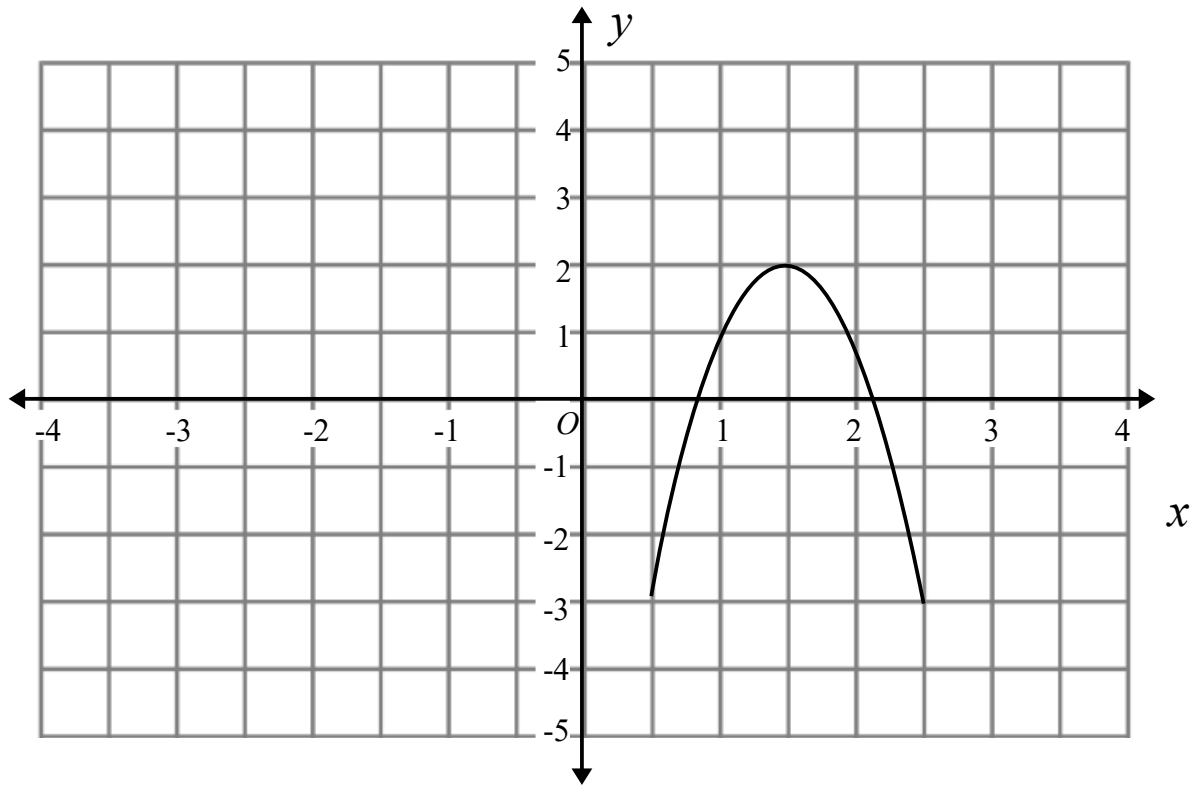**21**   Simplify fully $\dfrac{(6 + 2\sqrt{5})(6 - 2\sqrt{5})}{\sqrt{2}}$

You must show all your working.
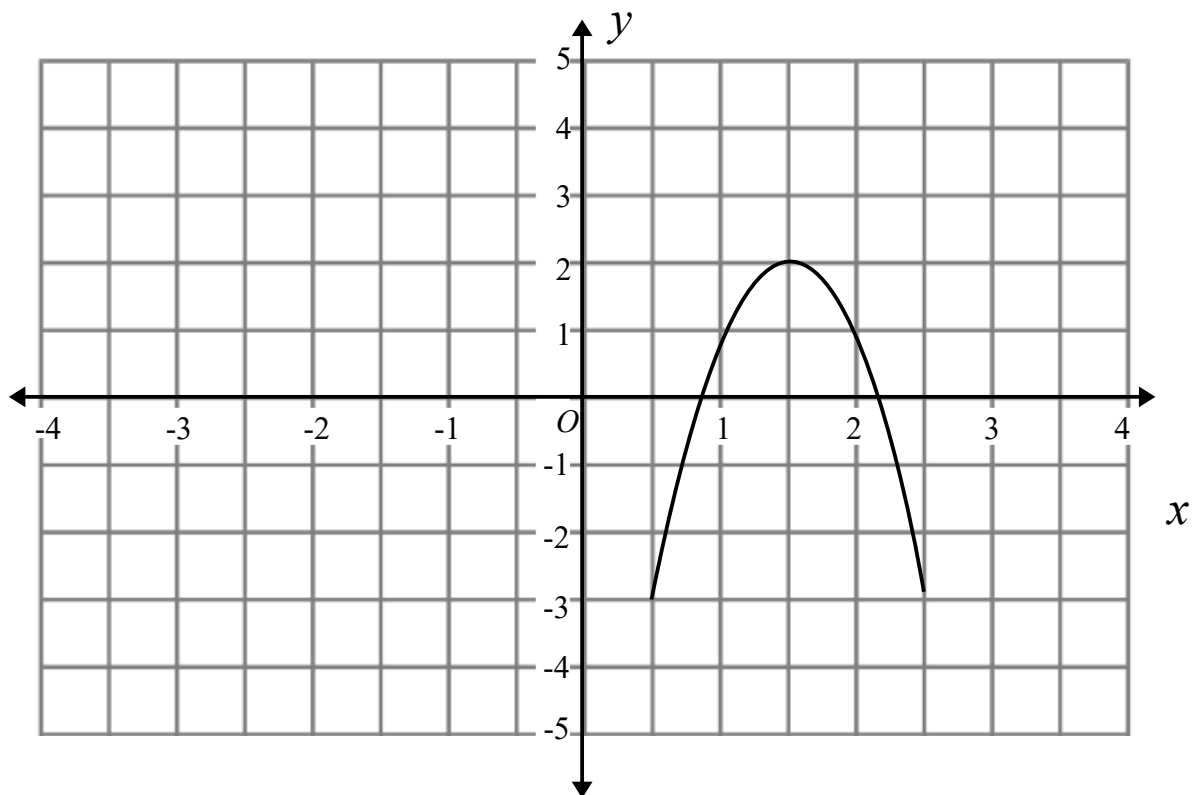
(Total for Question 21 is 3 marks)

22   The graph of $y = f(x)$ is shown on both grids below.

(a) On the grid above, sketch the graph of $y = -f(x)$.

(2)

(b) On the grid above, sketch the graph of $y = f(x - 2)$

(2)

(Total for Question 22 is 4 marks)

23 Work out the integer values that satisfy: $x < \dfrac{6}{x-1}$

....

(Total for Question 23 is 4 marks)