



Surname \_\_\_\_\_

Other Names \_\_\_\_\_

Centre Number \_\_\_\_\_

Candidate Number \_\_\_\_\_

Candidate Signature \_\_\_\_\_

I declare this is my own work.

**GCSE  
MATHEMATICS**

**H**

Higher Tier      Paper 1 Non-Calculator

**8300/1H**

**Tuesday 19 May 2020**

**Morning**

**Time allowed: 1 hour 30 minutes**

**At the top of the page, write your surname and other names, your centre number, your candidate number and add your signature.**

**[Turn over]**



J U N 2 0 8 3 0 0 1 H 0 1

**For this paper you must have:**  
• **mathematical instruments.**  
**You must NOT use a calculator.**



## **INSTRUCTIONS**

- **Use black ink or black ball-point pen. Draw diagrams in pencil.**
- **Answer ALL questions.**
- **You must answer the questions in the spaces provided. Do not write on blank pages.**
- **If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).**
- **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.

## **ADVICE**

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

**DO NOT TURN OVER UNTIL TOLD TO DO SO**



**Answer ALL questions in the spaces provided.**

- 1      Circle the fraction that is equivalent to 4.75  
[1 mark]**

$$\frac{15}{4}$$

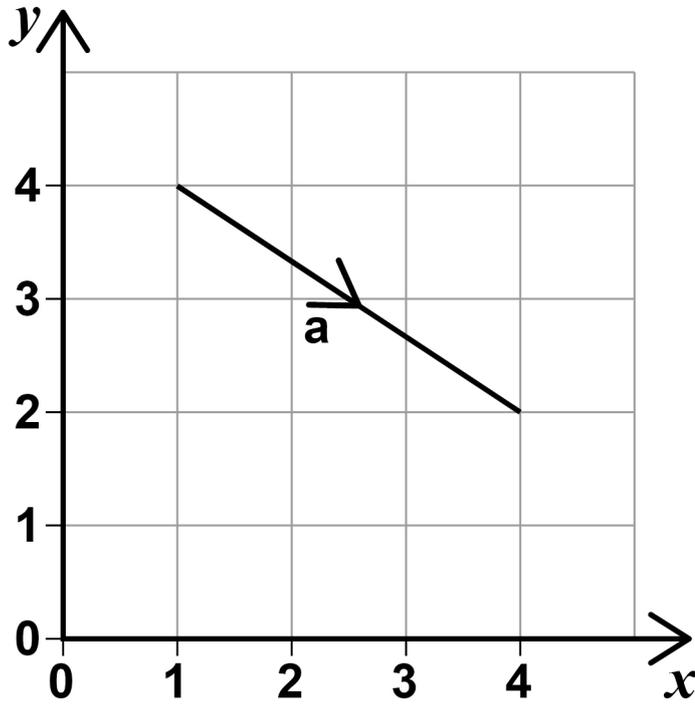
$$\frac{19}{4}$$

$$\frac{21}{4}$$

$$\frac{23}{4}$$



2 Here is vector a.



Circle the column vector that represents a.  
[1 mark]

$$\begin{pmatrix} 3 \\ 2 \end{pmatrix}$$

$$\begin{pmatrix} -3 \\ 2 \end{pmatrix}$$

$$\begin{pmatrix} 3 \\ -2 \end{pmatrix}$$

$$\begin{pmatrix} -3 \\ -2 \end{pmatrix}$$

[Turn over]



- 3 Which one of these is a square number AND a cube number?

Circle your answer. [1 mark]

100

1000

10 000

1 000 000

- 4 Circle the reciprocal of  $\frac{5}{6}$  [1 mark]

$\frac{6}{5}$

$\frac{1}{6}$

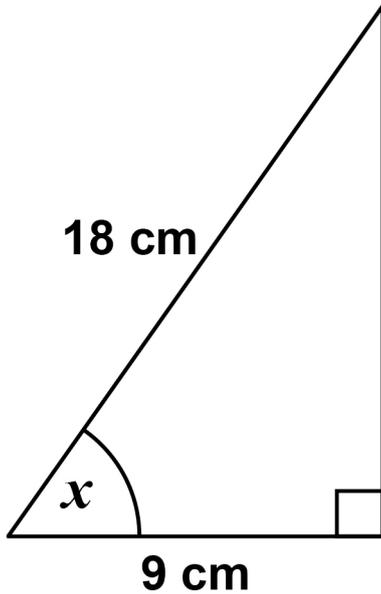
$-\frac{1}{6}$

$-\frac{6}{5}$



- 5 Use trigonometry to work out the size of angle  $x$ .  
[2 marks]

The diagram is not drawn accurately.



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Answer \_\_\_\_\_ degrees

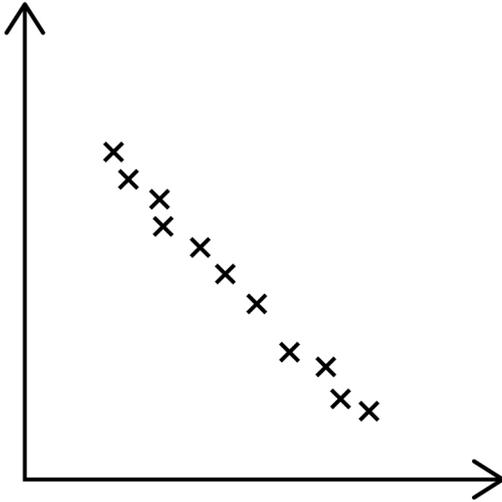
[Turn over]

6

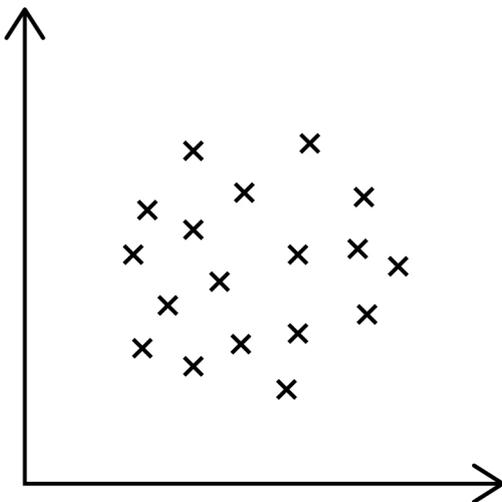


6 A and B are scatter graphs.

Graph A



Graph B



**What type of correlation is shown by each graph?**

**Choose from**

- **Weak positive**
- **Strong positive**
- **Weak negative**
- **Strong negative**
- **No correlation**

**[2 marks]**

**Graph A** \_\_\_\_\_

**Graph B** \_\_\_\_\_

**[Turn over]**



7 Here is some information about 80 people who play in bands.

12 are singers but not guitar players.

30% are neither a singer nor a guitar player.

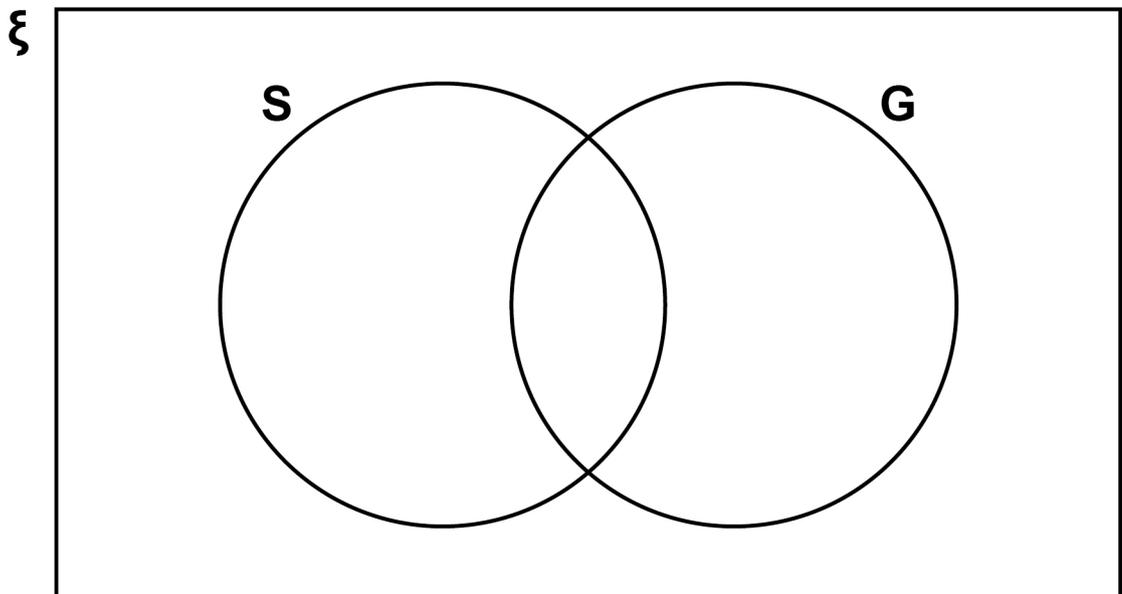
$\frac{1}{4}$  of the guitar players are also singers.

Complete this Venn diagram to represent the information. [4 marks]

$\xi$  = 80 people who play in bands

S = singers

G = guitar players





- 8 The shorter side of a parallelogram has length 6.5 cm

The diagram is not drawn accurately.



The length of the shorter side is  $\frac{1}{9}$  of the perimeter.

Work out the length of the longer side. [3 marks]

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Answer \_\_\_\_\_ cm

[Turn over]



- 9 (a) All the terms of a GEOMETRIC progression are positive.

The second and fourth terms are shown.

..... 4 ..... 16

Work out the first and third terms. [2 marks]

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First term \_\_\_\_\_

Third term \_\_\_\_\_



- 9 (b) The first two terms of an ARITHMETIC progression are shown.

$$p \quad 5p \quad \dots$$

The sum of the first three terms is 90

Work out the value of  $p$ . [3 marks]

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Answer \_\_\_\_\_

[Turn over]

8





11 As a decimal  $\frac{11}{40} = 0.275$

Work out  $\frac{33}{400}$  as a decimal. [2 marks]

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Answer \_\_\_\_\_

[Turn over]

6



**12 Two wire shapes make an earring.**

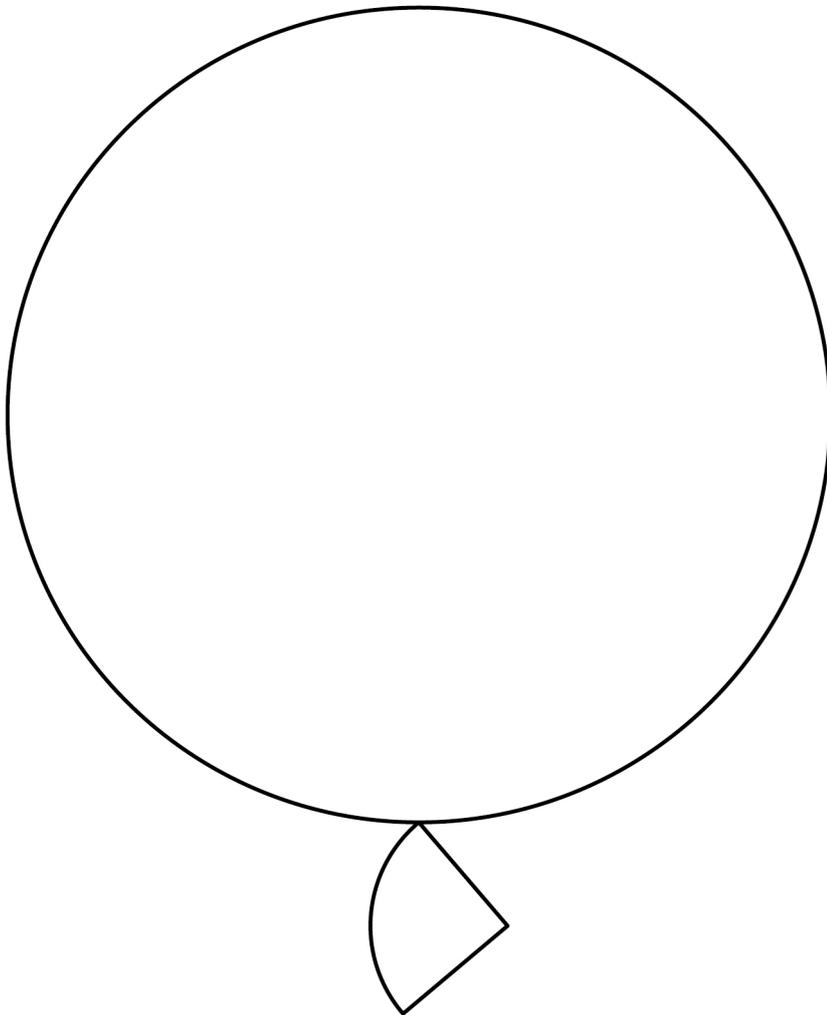
**The shapes are**

**a circle with radius 21 mm**

**and**

**a quarter circle.**

**The diagram is not drawn accurately.**



**radius of circle : radius of quarter circle = 7 : 2**



**12 (a) Show that the radius of the quarter circle is 6 mm [1 mark]**

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**[Turn over]**

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13 (b) Faisal tries to solve  $(x + 2)(x - 7) = 0$

Here is his working.

	$(x + 2) = 0$	or	$(x - 7) = 0$
Answer	$x = 2$	or	$x = 7$

Give a reason why his answer is wrong.  
[1 mark]

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[Turn over]

14 (a)  $c = 2^{10} \times 3 \times 5^6$

Work out  $18c$ .

Give your answer as a product of prime factors in index form. [2 marks]

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Answer \_\_\_\_\_



14 (b) Work out  $\sqrt[3]{\frac{2^7 \times 11^3}{2}}$

Give your answer as an integer. [2 marks]

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Answer \_\_\_\_\_

[Turn over]

7



15  $3x = \frac{1}{2}y$

Circle the ratio  $x : y$  [1 mark]

6 : 1

1 : 6

3 : 2

2 : 3



- 16 A sequence of numbers is formed by the iterative process

$$u_{n+1} = \frac{4}{u_n - 1} \quad u_1 = 9$$

Work out the values of  $u_2$  and  $u_3$  [2 marks]

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$$u_2 = \underline{\hspace{15em}}$$

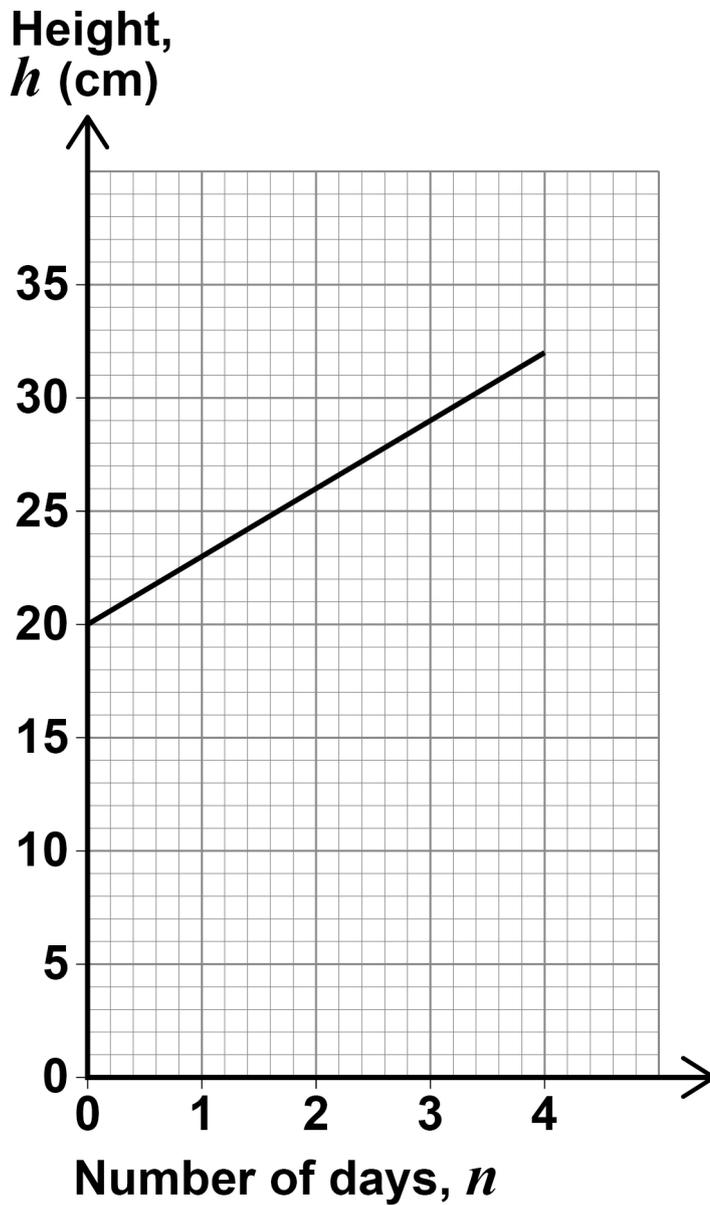
$$u_3 = \underline{\hspace{15em}}$$

[Turn over]



17 Jim buys a plant of height 20 cm

The graph shows how the height of the plant changes during the next 4 days.



Work out a formula for  $h$  in terms of  $n$ . [3 marks]

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Answer \_\_\_\_\_

[Turn over]

6





19 Circle the expression that is equivalent to

$$\frac{x}{5} + \frac{x}{10} \quad [1 \text{ mark}]$$

$$\frac{3x}{10}$$

$$\frac{2x}{15}$$

$$\frac{x}{25}$$

$$\frac{x^2}{50}$$

20 (a) Write down the value of  $7^0$  [1 mark]

Answer \_\_\_\_\_

20 (b) Work out the value of  $32^{-\frac{3}{5}}$  [2 marks]

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Answer \_\_\_\_\_

[Turn over]



21 Write these numbers in order of size.

15.6

 $3\sqrt{23}$  $2.1^4$  $\frac{47}{3}$ 

Start with the smallest. [2 marks]

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**Smallest**

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**Largest**

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**[Turn over]**





22 (b)  $m$  is inversely proportional to  $\sqrt{r}$

The value of  $r$  is multiplied by 4

Circle what happens to the value of  $m$ . [1 mark]

$\times 2$

$\times 16$

$\div 2$

$\div 16$

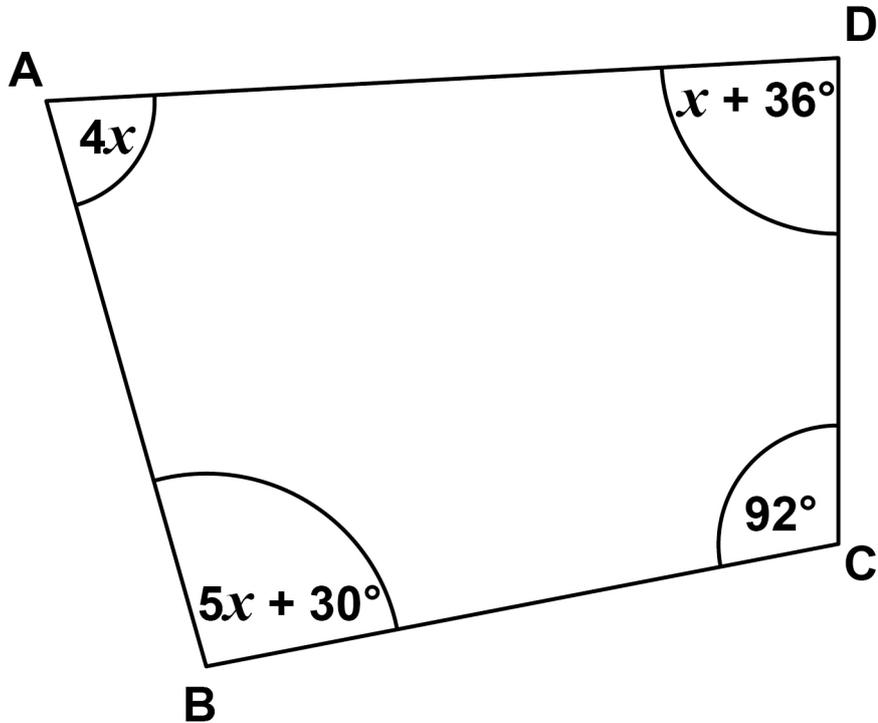
[Turn over]

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23  $ABCD$  is a quadrilateral.

The diagram is not drawn accurately.



Prove that  $ABCD$  is NOT a cyclic quadrilateral.  
[4 marks]

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24  $y$  is an obtuse angle.

Which statement is true?

Tick ONE box. [1 mark]

$$\sin y > 0 \text{ and } \cos y > 0$$

$$\sin y > 0 \text{ and } \cos y < 0$$

$$\sin y < 0 \text{ and } \cos y > 0$$

$$\sin y < 0 \text{ and } \cos y < 0$$

5



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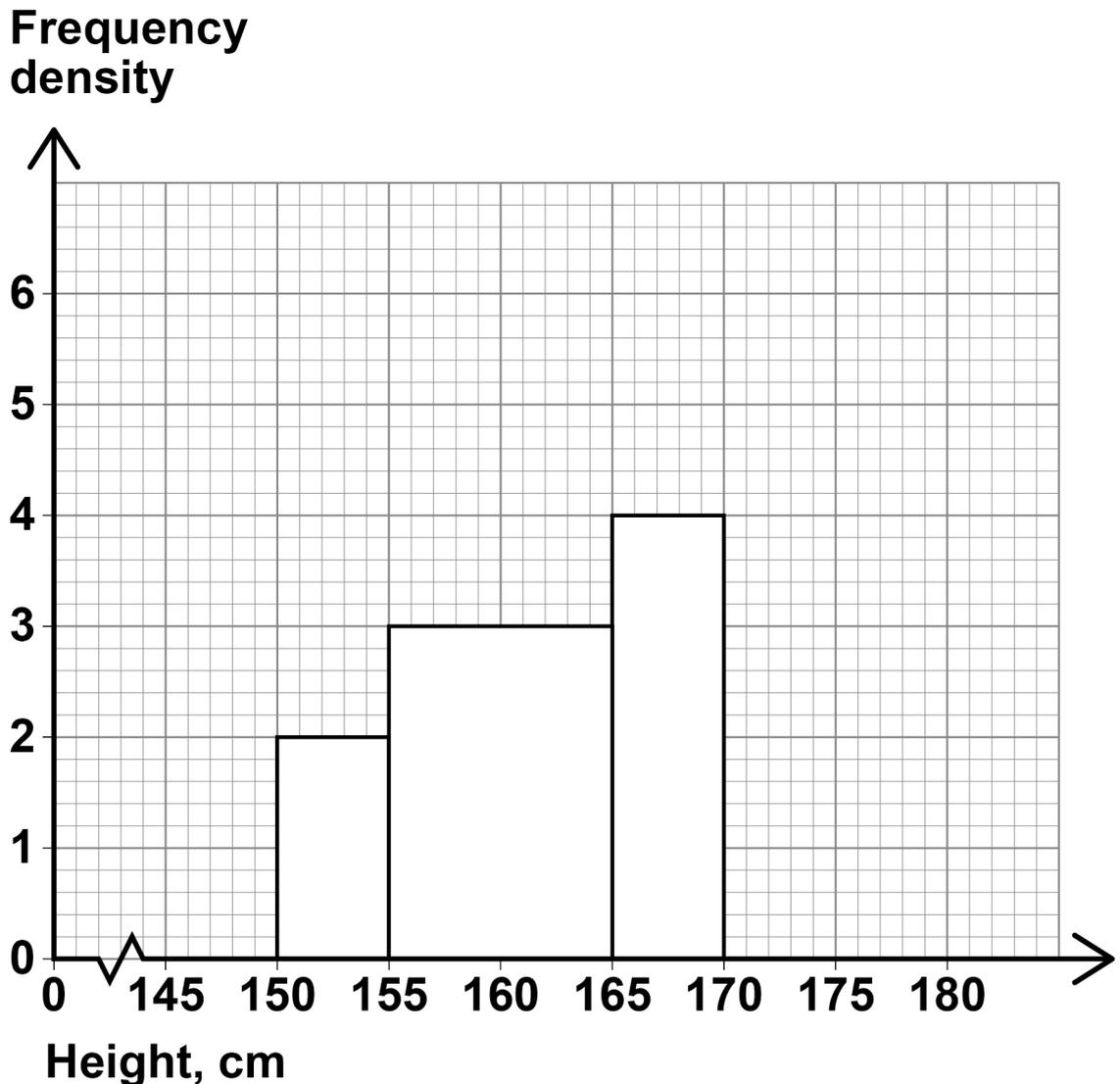
**[Turn over]**



- 25 A histogram is drawn to represent the heights of a sample of women.

Three of the four bars are shown.

The bar for  $170 \text{ cm} \leq \text{height} < 180 \text{ cm}$  is missing.



There are 74 women in the sample.

Complete the histogram. [4 marks]





- 26 (a) Show that  $\frac{14}{\sqrt{7}}$  can be written in the form  $a\sqrt{b}$  where  $a$  and  $b$  are integers. [2 marks]

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27 A and B are similar solid cylinders.

$$\text{base area of A : base area of B} = 9 : 25$$

Complete these ratios. [2 marks]

curved surface area of A : curved surface area of B =

\_\_\_\_\_ : \_\_\_\_\_

height of A : height of B =

\_\_\_\_\_ : \_\_\_\_\_



28 Factorise fully  $144 - 4x^2$  [2 marks]

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Answer \_\_\_\_\_

[Turn over]





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Answer \_\_\_\_\_

**END OF QUESTIONS**

<b>8</b>







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For Examiner's Use	
Pages	Mark
4–7	
8–11	
12–15	
16–17	
18–21	
22–25	
26–29	
30–31	
32–35	
36–38	
40–43	
44–47	
<b>TOTAL</b>	

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