Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
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0796500410

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/42**

Paper 4 (Extended) **February/March 2021**

2 hours 15 minutes

You must answer on the question paper.

You will need: Geometrical instruments

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should use a graphic display calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly and you will be given marks for correct methods, including sketches, even if your answer is incorrect.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For π, use your calculator value.

INFORMATION

- The total mark for this paper is 120.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **20** pages. Any blank pages are indicated.

[Turn over

Formula List

For the equation $ax^2 + bx + c = 0$ $\quad x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Curved surface area, A, of cylinder of radius r, height h. $\quad A = 2\pi rh$

Curved surface area, A, of cone of radius r, sloping edge l. $\quad A = \pi rl$

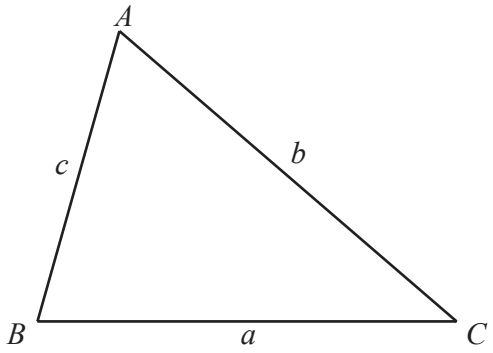
Curved surface area, A, of sphere of radius r. $\quad A = 4\pi r^2$

Volume, V, of pyramid, base area A, height h. $\quad V = \frac{1}{3}Ah$

Volume, V, of cylinder of radius r, height h. $\quad V = \pi r^2 h$

Volume, V, of cone of radius r, height h. $\quad V = \frac{1}{3}\pi r^2 h$

Volume, V, of sphere of radius r. $\quad V = \frac{4}{3}\pi r^3$



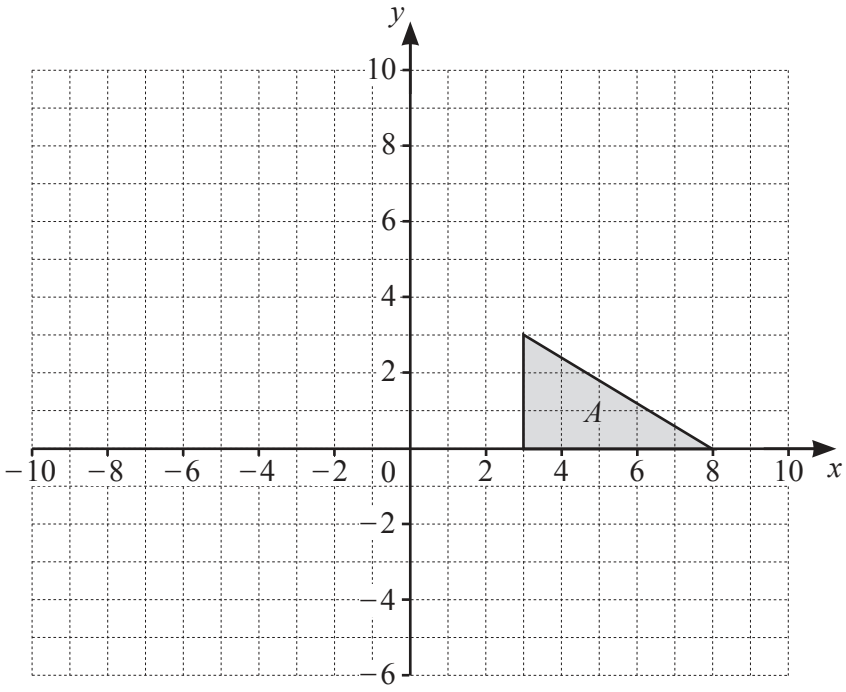
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc\cos A$$

$$\text{Area} = \frac{1}{2}bc\sin A$$

Answer **all** the questions.

1 (a)



(i) Rotate triangle *A* through 90° anticlockwise about (0, 0). Label the image *B*. [2]

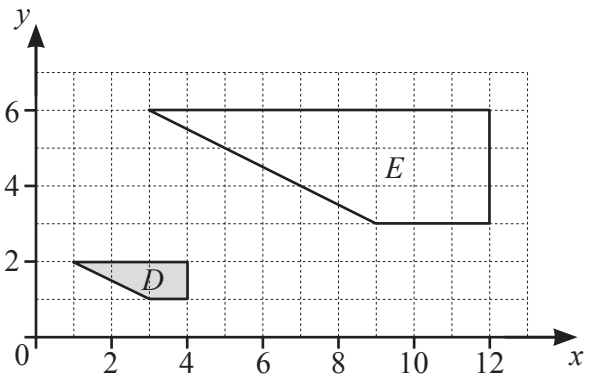
(ii) Reflect triangle *A* in the *y*-axis. Label the image *C*. [1]

(iii) Describe fully the **single** transformation that maps triangle *B* onto triangle *C*.

.....

..... [2]

(b)



Describe fully the **single** transformation that maps trapezium *D* onto trapezium *E*.

.....

..... [3]

2 **(a)** Write $260\,512$ correct to 3 significant figures.

..... [1]

(b) Write $0.000\,000\,576$ in standard form.

..... [1]

(c) Calculate $\sqrt{27^2 - 6 \times 31^{0.3}}$.
Give your answer correct to 1 decimal place.

..... [2]

(d) **(i)** Work out 37% of \$820.

\$ ..... [2]

(ii) Work out \$36 as a percentage of \$150.

..... % [1]

(e) An amount of money is shared between Alan, Bjorn and Carlo in the ratio 3 : 7 : 5.
Carlo receives \$695.

(i) Find the total amount of money shared.

\$ ..... [3]

(ii) Carlo invests 40% of his \$695 at a rate of 1.2% per year compound interest.

Calculate the value of his investment at the end of 5 years.

\$ ..... [3]

(f) Dana invests \$2100 for 12 years at a rate of x% per year compound interest.
At the end of the 12 years, the value of her investment is \$2663.31 .

Calculate the value of x.

$x =$ ..... [3]

3 **(a)** **(i)** Write down the coordinates of the point where the line $y = -2x + 3$ crosses the y-axis.

(..... , ...) [1]

(ii) Write down the gradient of the line $y = -2x + 3$.

..... [1]

(b) The line $x + y = 6$ crosses the line $x = -2$ at point A.

Find the y-coordinate of A.

..... [1]

(c) Find the equation of the straight line that passes through the points $(3, -1)$ and $(12, 5)$.

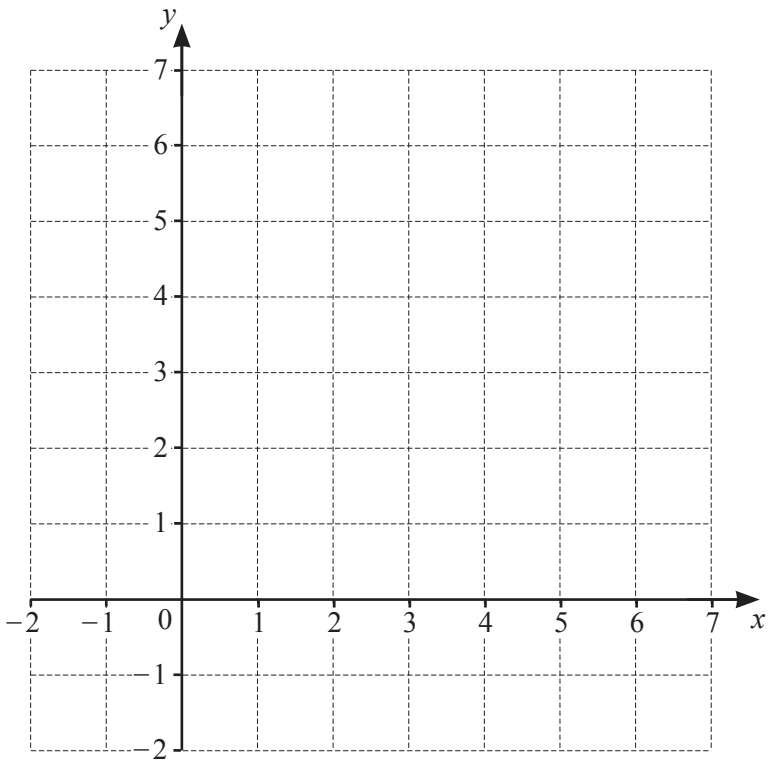
..... [3]

(d) The line L passes through the point $(3, 4)$.
Line L is perpendicular to the line $2y = 5x + 6$.

Find the equation of line L.

..... [4]

(e)



(i) On the grid, draw the lines $y = 4$, $x + y = 3$ and $y = x - 1$. [3]

(ii) By shading the unwanted regions, find and label the region R that satisfies these three inequalities.

$y \leqslant 4$
$x + y \geqslant 3$
$y \geqslant x - 1$ [1]

4 **(a)** The mass, m grams, of each of 50 apples is found.
The results are shown in the table.

Mass (m grams)	Frequency
$70 < m \leqslant 90$	2
$90 < m \leqslant 110$	7
$110 < m \leqslant 130$	14
$130 < m \leqslant 150$	10
$150 < m \leqslant 170$	12
$170 < m \leqslant 190$	5

(i) Write down the modal class.

..... $< m \leqslant$ ..... [1]

(ii) Calculate an estimate of the mean.

..... g [2]

(b) The mass, x grams, of each of 120 different apples is found.
The results are shown in Table 1.

(i) Complete the cumulative frequency column in Table 2.

Mass (x grams)	Frequency
$70 < x \leqslant 90$	8
$90 < x \leqslant 110$	8
$110 < x \leqslant 120$	22
$120 < x \leqslant 130$	39
$130 < x \leqslant 140$	27
$140 < x \leqslant 150$	9
$150 < x \leqslant 170$	7

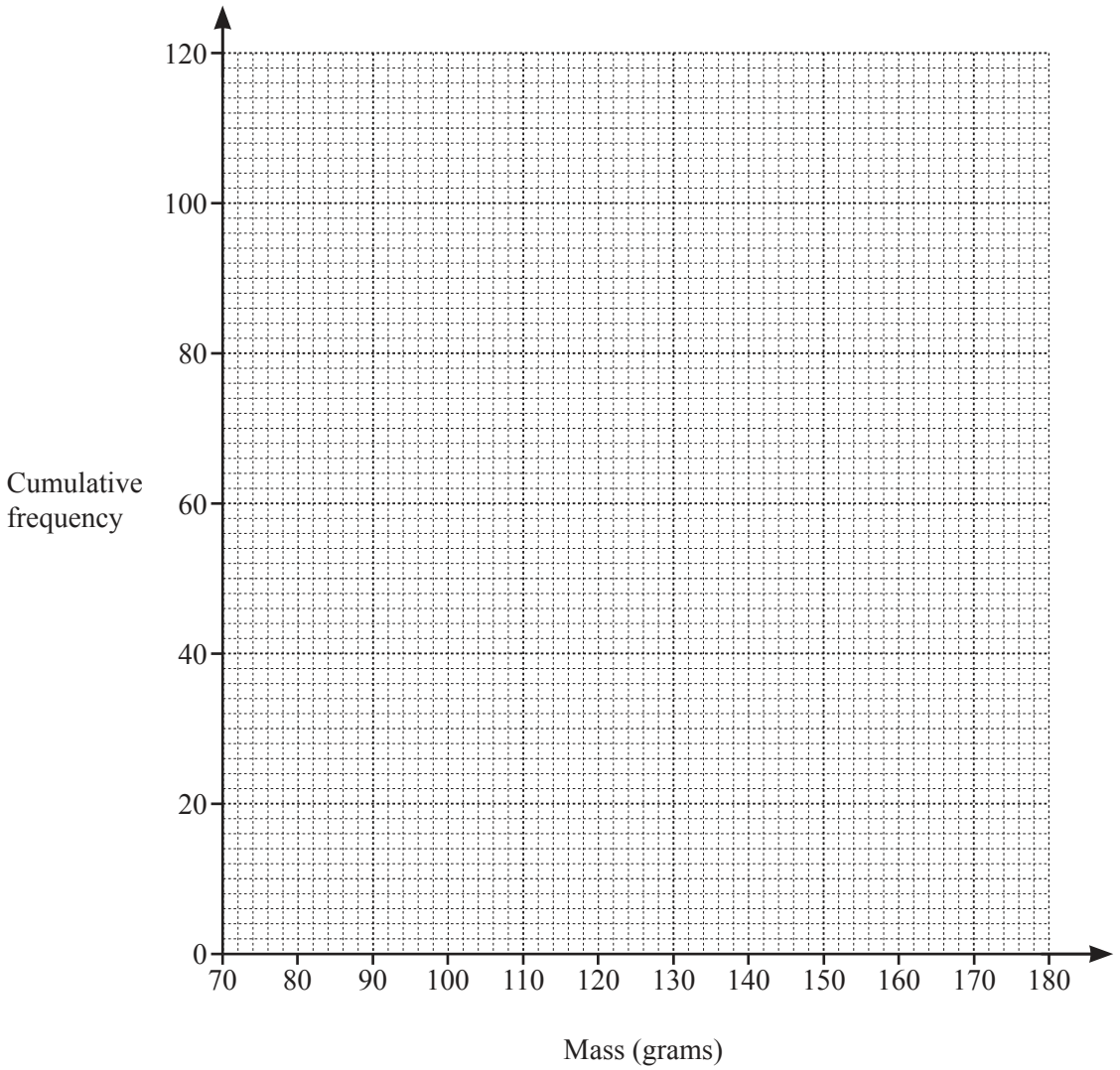
Table 1

Mass (x grams)	Cumulative Frequency
$x \leqslant 90$	8
$x \leqslant 110$	
$x \leqslant 120$	
$x \leqslant 130$	
$x \leqslant 140$	
$x \leqslant 150$	
$x \leqslant 170$	

Table 2

[2]

(ii) On the grid, draw the cumulative frequency curve to show the results in Table 2.



[3]

(iii) Use your cumulative frequency curve to estimate

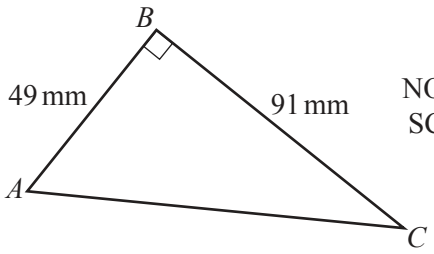
(a) the median,

..... g [1]

(b) the interquartile range.

..... g [2]

5 **(a)**

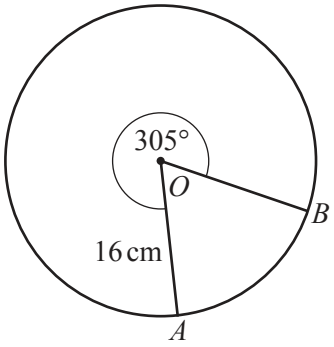


NOT TO SCALE

Calculate the length of AC.

$AC =$ ..... mm [2]

(b)



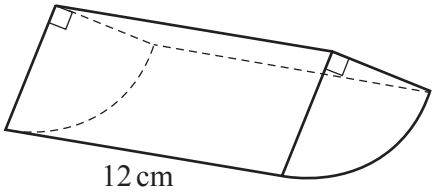
NOT TO SCALE

The diagram shows a circle with centre O and radius 16 cm.

Calculate the length of the major arc AB.

..... cm [2]

(c)



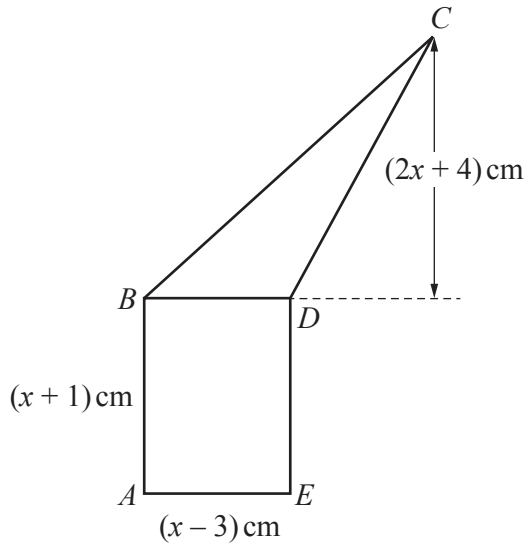
NOT TO SCALE

The diagram shows a prism with length 12 cm.
The cross-section of the prism is a quarter of a circle.
The radius of the circle is 6 cm.

Calculate the volume of the prism.

..... cm^3 [2]

(d)



NOT TO SCALE

Shape *ABCDE* is made by joining rectangle *ABDE* and triangle *BCD*.
The perpendicular height of triangle *BCD* is $(2x + 4)$ cm.
The total area of *ABCDE* is 11 cm^2.

(i) Show that $2x^2 - 3x - 20 = 0$.

[3]

(ii) Factorise $2x^2 - 3x - 20$.

..... [2]

(iii) Use your answer to **part (ii)** to solve the equation $2x^2 - 3x - 20 = 0$.

$x =$ ..... or $x =$ ..... [1]

(iv) Find the perpendicular height of triangle *BCD*.

..... cm [1]

6 **(a)** y is inversely proportional to the square of x.

(i) When $x = 2$, $y = 8$.

Find y in terms of x.

$y =$ ..... [2]

(ii) Find the value of y when $x = 4$.

$y =$ ..... [1]

(iii) Find the value of x when $y = 128$.

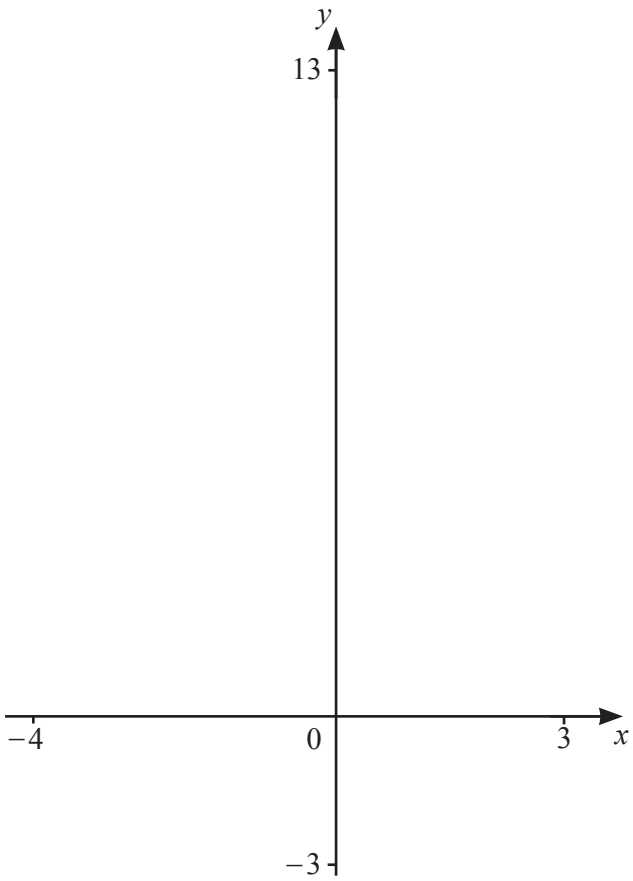
$x =$ ..... [2]

(b) r is directly proportional to the cube of $(p + 1)$.
When $p = 1$, $r = 16$.

Find the value of r when $p = 4$.

$r =$ ..... [3]

7



$g(x) = \frac{1}{x-2}$, $x \neq 2$

(a) On the diagram, sketch the graph of $y = g(x)$ for values of x between -4 and 3. [3]

(b) Write down the equations of the asymptotes of the graph of $y = g(x)$.

.....

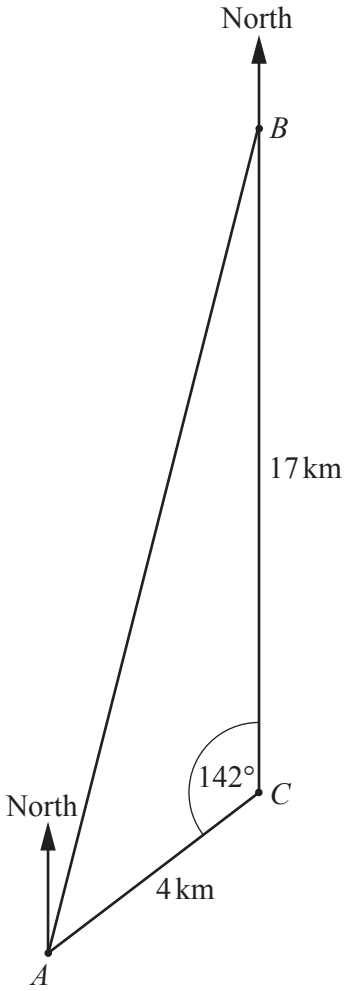
..... [2]

(c) $h(x) = (x+1)^2 - 3$

Solve the inequality $g(x) > h(x)$.

..... [4]

8



NOT TO SCALE

Rani sails in a boat race around a triangular course.
She sails from A to B to C and then directly back to A.
B is due north of C.

(a) Find the bearing Rani sails on from C to A.

..... [1]

(b) Show that $AB = 20.3$ km, correct to 1 decimal place.

[3]

(c) Calculate the bearing of B from A.

..... [3]

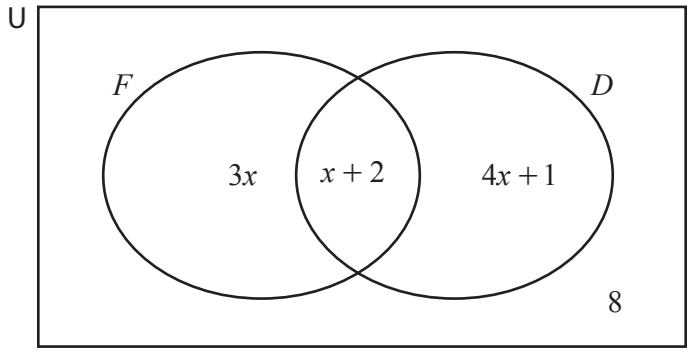
(d) Rani starts the race at 08 57 and returns to A at 12 33.

Calculate the average speed of her boat in km/h.

..... km/h [3]

9 **(a)** The Venn diagram shows information about 115 people who play musical instruments.

F = {people who play the flute}
D = {people who play the drums}



(i) Calculate the number of people who play both the flute and the drums.

..... [3]

(ii) On the Venn diagram, shade $F' \cap D$. [1]

(iii) Briony plays both the flute and the drums.

Use set notation to complete the statement.

Briony ..... $(F \cap D)$ [1]

(b) Briony has 6 red socks, 4 green socks and 8 white socks.

(i) She picks a sock at random.

Find the probability that the sock is green.

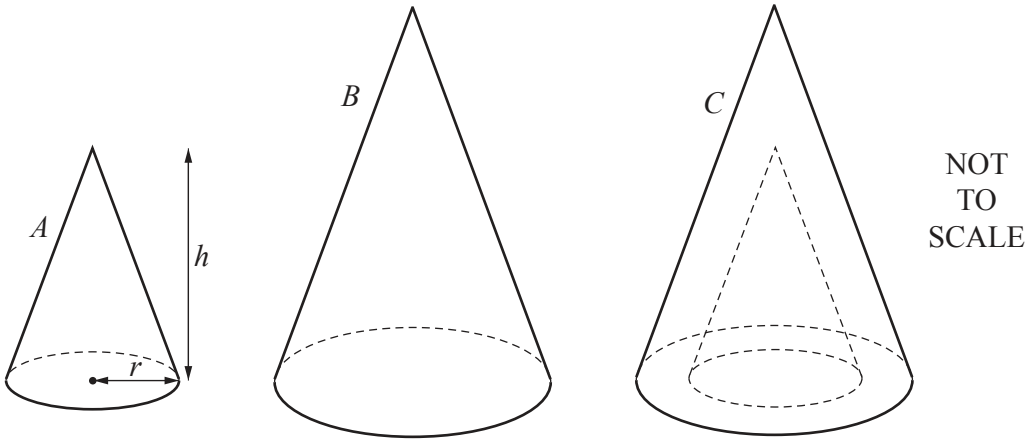
..... [1]

(ii) Briony replaces the sock.
She now picks two socks at random, without replacement.

Calculate the probability that the two socks are different colours.

..... [4]

10



Cone A has radius r and perpendicular height h.
Cone B is mathematically similar to cone A.
Solid C is formed by removing cone A from cone B.

The ratio height of cone A : height of cone B = 2 : 3.

(a) Find the ratio volume of cone A : volume of solid C.

..... : ..... [3]

(b) Cone A has radius 4 cm and height 10 cm.

Calculate the **total** surface area of solid C.

..... cm^2 [8]

Question 11 is printed on the next page.

11 $f(x) = 3x + 1$ $g(x) = x^2 - 5$ $h(x) = 3^x$

(a) Find g(3).

..... [1]

(b) Find f(h(2)).

..... [2]

(c) Find the value of r when $f(r) = r$.

$r =$ ..... [2]

(d) Solve $g(f(x)) = 20$.

$x =$ ..... or $x =$ ..... [3]

(e) Find $h^{-1}(x)$.

$h^{-1}(x) =$ ..... [2]