Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

6717675363

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/42**

Paper 4 (Extended) **October/November 2022**

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.

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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. $\quad A = \pi rl$

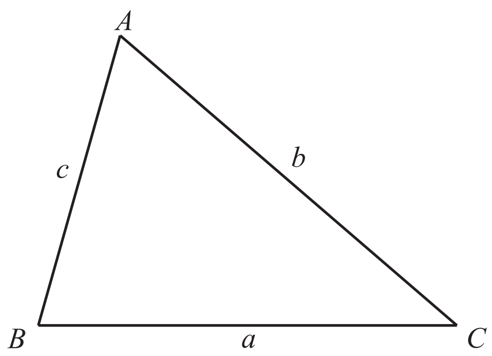
Curved surface area, A, of sphere of radius r. $\quad A = 4\pi r^2$

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

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

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

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



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

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

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

Answer **all** the questions.

1 Giselle flies from Paris (France) to Atlanta (USA).

(a) She changes 8500 euros (€) to USA dollars ($).
She receives $9520.

Calculate the exchange rate.

€1 = $ .... [1]

(b) The aircraft leaves at 10 35 local time and the flight takes 9 hours 30 minutes.
The time in Atlanta is 6 hours behind the time in Paris.

(i) Find the local time in Atlanta when the aircraft lands.

.... [2]

(ii) On the return flight the aircraft leaves Atlanta at 23 08 local time and arrives in Paris the next day at 13 25 local time.
The distance from Atlanta to Paris is 7072 km.

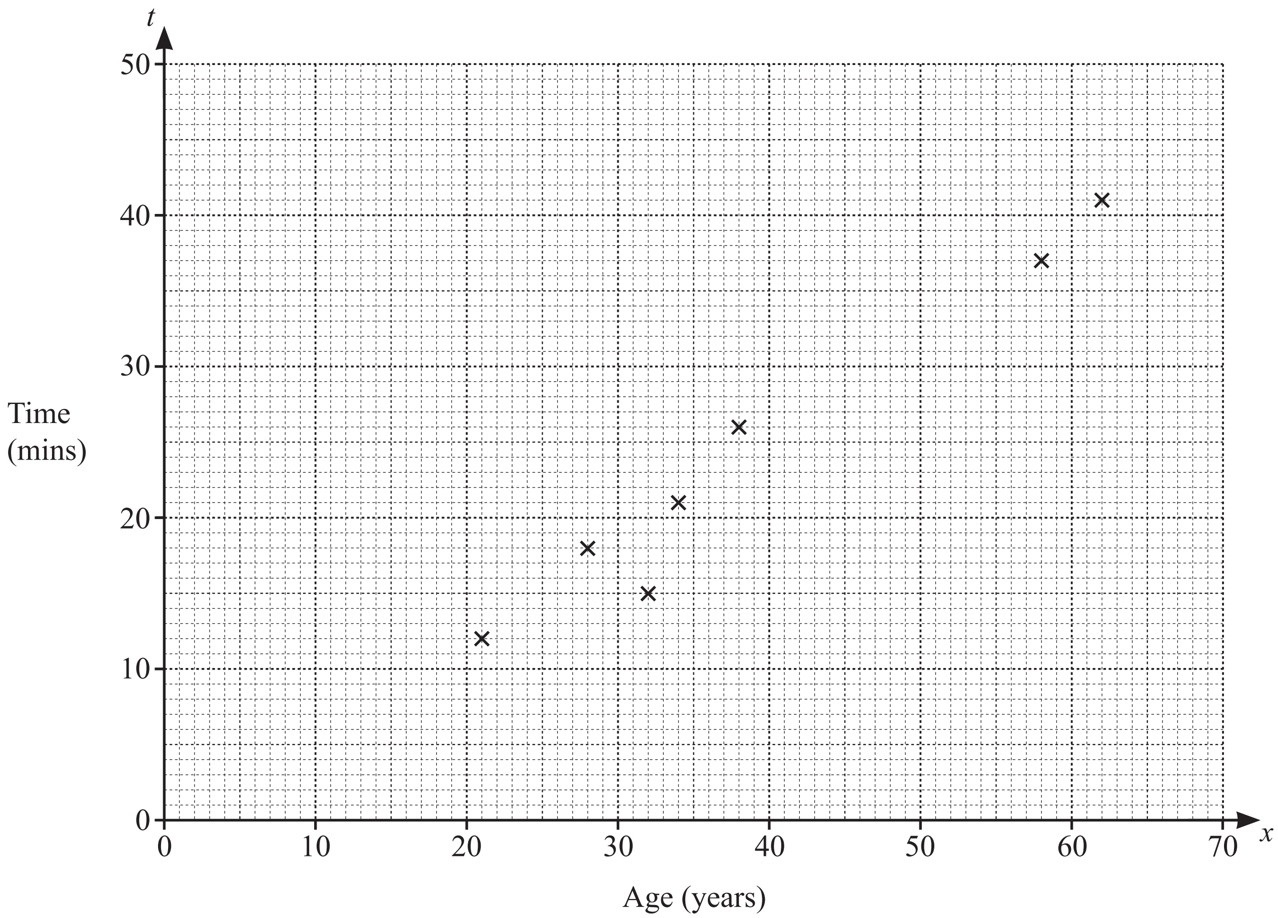
Find the average speed for the flight from Atlanta to Paris.

.... km/h [4]

2 The times, t minutes, taken for 12 people to do a task and their ages, x years, are recorded.
The results are shown in the table.

Age, x years	21	32	58	34	28	62	38	27	29	43	29	52
Time, t mins	12	15	37	21	18	41	26	18	15	31	23	33

(a) Complete the scatter diagram.
The first seven points have been plotted for you.



[2]

(b) What type of correlation is shown on the scatter diagram?

.... [1]

(c) Find the equation of the regression line.
Give your answer in the form $t = ax + b$.

$t =$ .... [2]

(d) Use your regression equation to estimate the time it would take a person aged 48 to do the task.

.... mins [1]

(e) Give a reason why you should not use the regression equation to estimate the time it would take a person aged 12 to do the task.

.... [1]

3 **(a)** Sachin earns \$63 000 per year before paying tax.
He pays tax on his earnings at a rate of 16%.

Calculate the amount Sachin has after paying tax.

\$ .... [2]

(b) Britte has \$60 480 per year **after** paying tax at a rate of 16%.

Calculate the amount that Britte earns before paying tax.

\$ .... [2]

(c) **(i)** Sachin opens a savings account with \$1500 on 1 January.
The account pays 1.8% per year simple interest.

Show that the amount in Sachin's account at the end of 3 years is \$1581.

[2]

(ii) Britte also opens a savings account on 1 January.
The account pays 2% per year compound interest.
Britte pays \$500 into her account on 1 January every year.

Find who has the greater amount in their account at the end of 3 years.
Give the difference correct to the nearest cent.

.... by \$ .... [4]

4 A is the point $(-2, -3)$ and B is the point $(4, 9)$.

(a) Find the length of AB.

.... [3]

(b) Find the equation of the perpendicular bisector of AB.

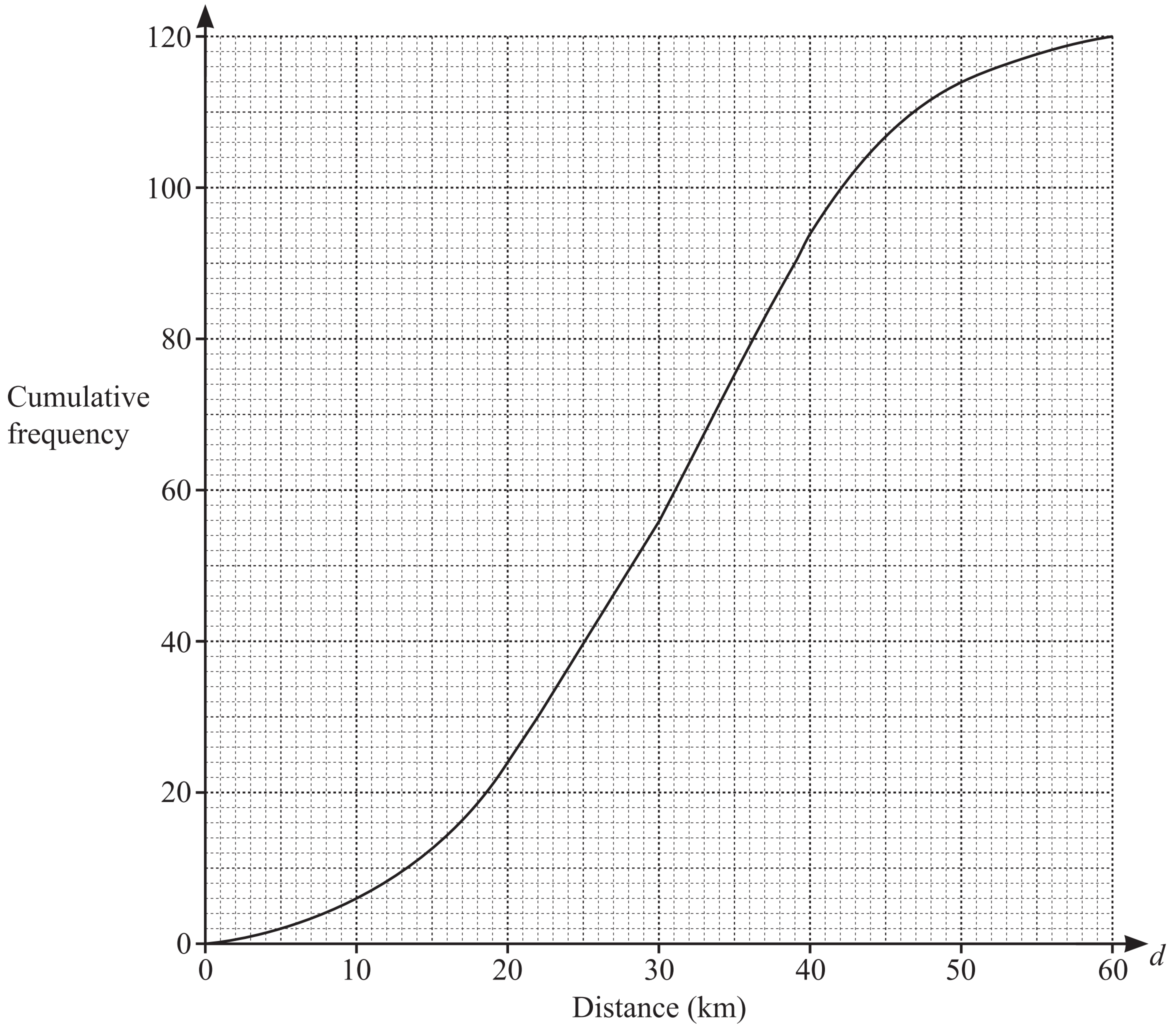
.... [5]

(c) C is a point on AB.
C divides AB in the ratio $2 : 1$.

Find the coordinates of C.

(..................... , ...) [2]

5 The distance, d km, cycled by each of 120 cyclists was recorded.
The results are shown in the cumulative frequency curve.



(a) Use the curve to estimate

(i) the median,

.... km [1]

(ii) the interquartile range.

.... km [2]

(b) Use the curve to complete the frequency table.

Distance (d km)	$0 < d \leqslant 10$	$10 < d \leqslant 20$	$20 < d \leqslant 30$	$30 < d \leqslant 40$	$40 < d \leqslant 50$	$50 < d \leqslant 60$
Frequency	6	18				

[2]

(c) Write down the modal class.

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

(d) Calculate an estimate for the mean.

.... km [2]

6 **(a)** Simplify.

(i) $5(2a+3)-3(a-7)$

.... [2]

(ii) $\frac{2x}{3}-\frac{x-1}{2}$

.... [2]

(b) $x=\frac{ab+3}{b-2}$

Rearrange the formula to make

(i) a the subject,

$a =$ .... [3]

(ii) b the subject.

$b =$ .... [2]

(c) Solve.

(i) $x^{12} = 1200$

$x =$ .... [1]

(ii) $1.2^x = 12$

$x =$ .... [2]

(iii) $|x+3| = 7$

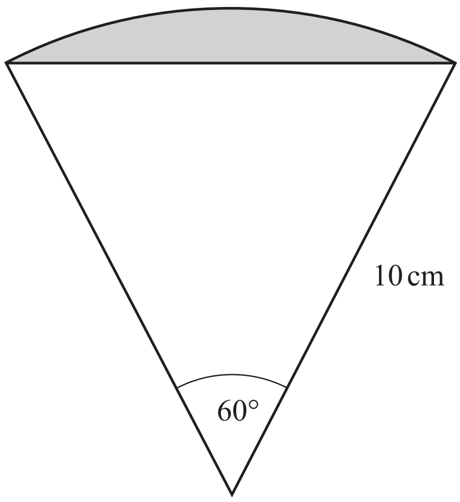
.... [2]

(d) Solve by factorising.

$$6x^2 - 11x - 10 = 0$$

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

7 (a)



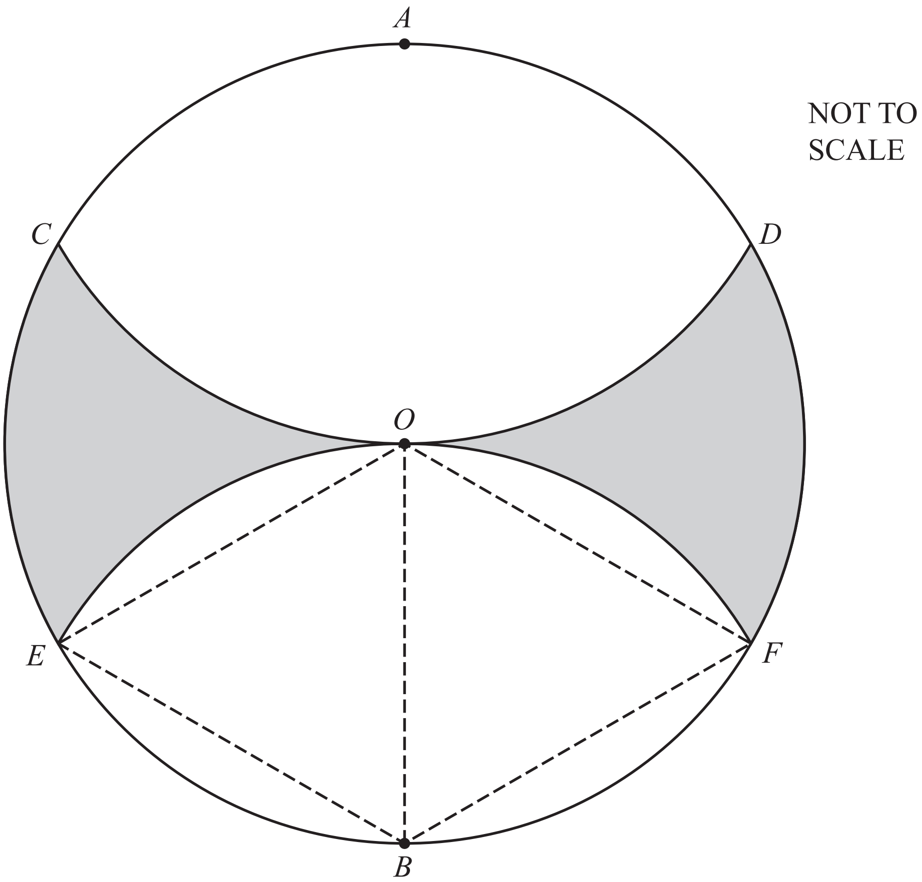
NOT TO SCALE

The diagram shows a sector of a circle with sector angle 60° and radius 10 cm.

Calculate the area of the shaded segment.

.... cm^2 [3]

(b)



The diagram shows a circle with radius 10 cm and centre O.
A and B are at opposite ends of a diameter.
COD is an arc of a circle centre A.
EOF is an arc of a circle centre B.

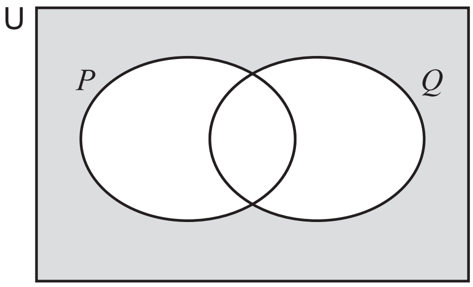
(i) Calculate the area of the shaded region.

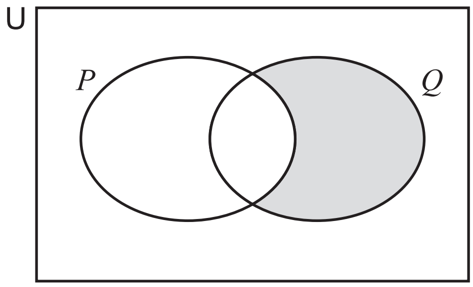
.... cm^2 [4]

(ii) Calculate the perimeter of the shaded region.

.... cm [2]

8 **(a)** Use set notation to describe the shaded regions.

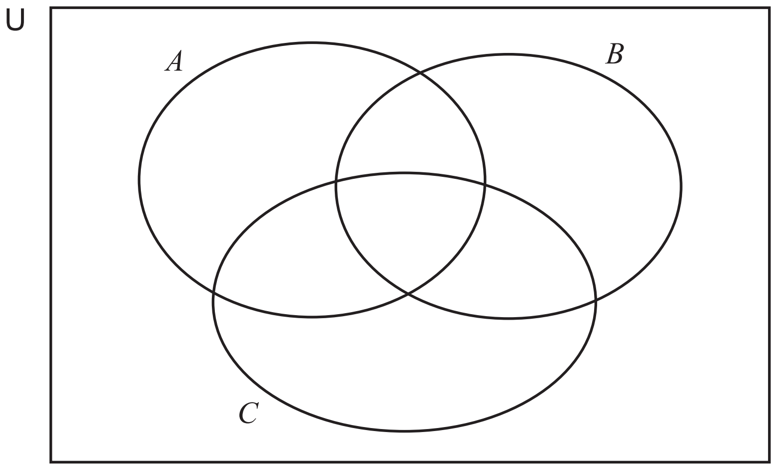




.... [2]

(b) U = {Integers $x \mid 3 \leqslant x \leqslant 15$}
A = {Multiples of 3}
B = {Integers $x \mid 6 \leqslant x \leqslant 12$}
C = {Factors of 24}

(i) Write all the elements of U in the correct parts of the Venn diagram.



[3]

(ii) List the members of the set $A \cap B \cap C'$.

.... [1]

(iii) List the members of the set $(A \cup C)' \cap B$.

.... [1]

(iv) Find $\mathrm{n}((B \cup C) \cap A')$.

.... [1]

9 The table gives some information about a group of 200 people.

	Eye colour			Total
	Brown	Blue	Green	
Right-handed		51		144
Left-handed	24	18		56
Total		69	20	200

(a) Complete the table. [2]

(b) Find the probability that one of these people chosen at random has blue eyes.

.... [1]

(c) Two of these people are chosen at random.

Find the probability that they are both left-handed.

.... [2]

(d) Two of the left-handed people are chosen at random.

Find the probability that they both have brown eyes.

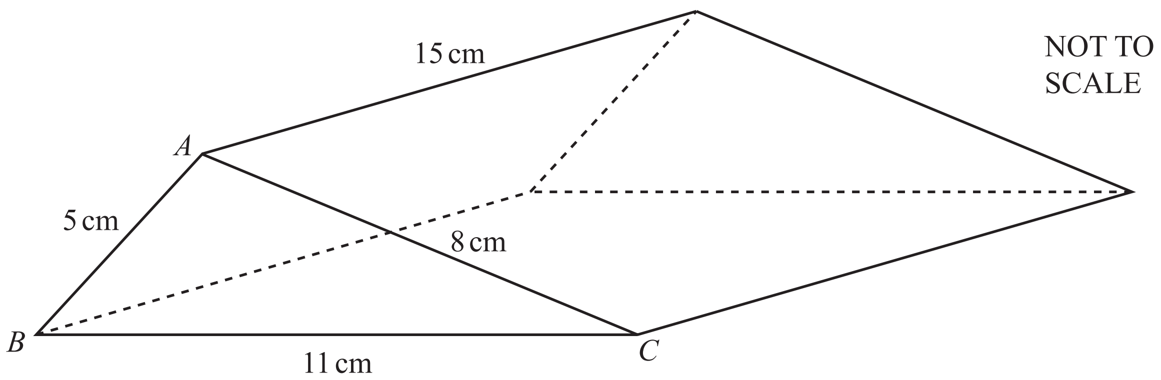
.... [2]

(e) Two of the people with blue eyes are chosen at random.

Find the probability that one is right-handed and the other is left-handed.

.... [3]

10



Triangle ABC is the cross-section of a prism of length 15 cm.
$AB = 5\text{ cm}$, $AC = 8\text{ cm}$ and $BC = 11\text{ cm}$.

(a) Show that the area of triangle $ABC = 18.33\text{ cm}^2$ correct to 2 decimal places.

[4]

(b) Find the volume of the prism.

.... cm^3 [1]

(c) Find the total surface area of the prism.

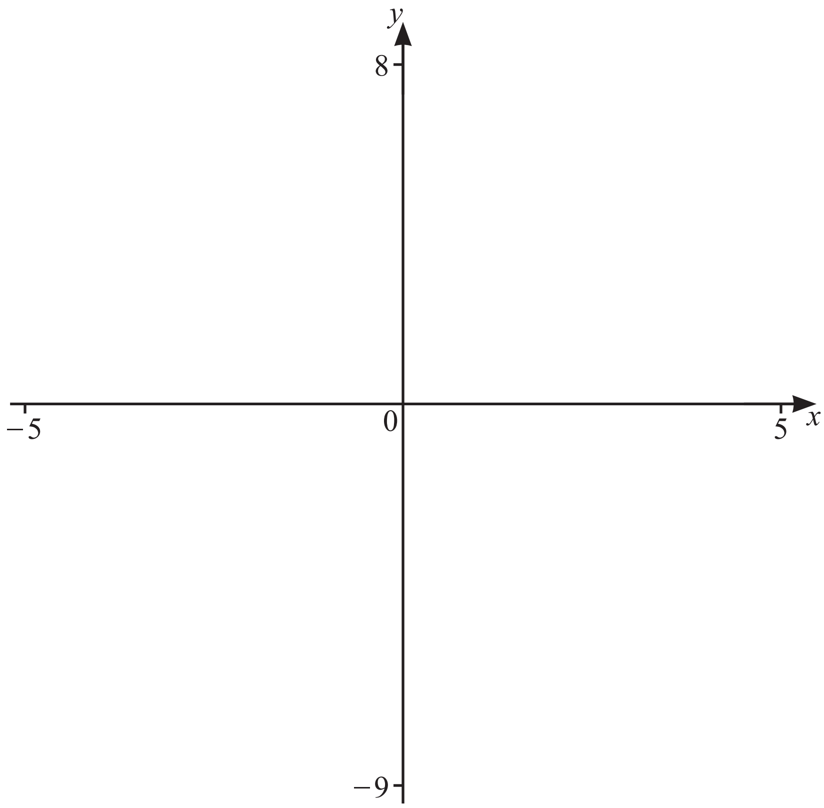
.... cm^2 [2]

(d) A mathematically similar prism has a volume of $500\,cm^3$.

Calculate the total surface area of this similar prism.
Give your answer correct to 2 significant figures.

.... cm^2 [3]

11



$$f(x) = x + \frac{5}{(x-2)(x+3)}$$

(a) Sketch the graph of $y = f(x)$ for values of x between -5 and 5. [4]

(b) Write down the equations of the asymptotes parallel to the y-axis.

.... [2]

(c) **(i)** Find the coordinates of the local maximum.

(...................... , ...) [2]

(ii) Find the coordinates of the local minimum.

(...................... , ...) [2]

(iii) Write down the range of values of k for which $f(x) = k$ has exactly one solution.

.... [2]

(d) $g(x) = -4 - x$

(i) Solve the equation $f(x) = g(x)$.

.... [3]

(ii) Find the solutions to the inequality $f(x) > g(x)$.

.... [3]

Question 12 is printed on the next page.

12 $P = 2n + 1$ where n is a positive integer.

(a) Show that P^2 is always an odd number.

[2]

(b) P and Q are consecutive odd numbers where $Q > P$.

(i) Write down an expression for Q, in terms of n.

.... [1]

(ii) Show that $Q^2 - P^2$ is always a multiple of 8.

[3]