Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

6664245211

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/41**

Paper 4 (Extended) **May/June 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.

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. $\quad A = \pi rl$

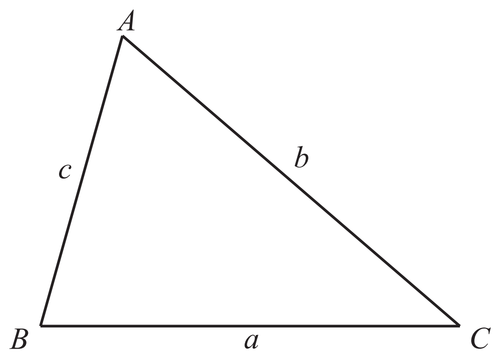
Curved surface area, A, of sphere of radius r. $\quad A = 4\pi r^2$

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 stadium sells tickets at 10 different prices for a sporting event.
The table shows the number of tickets sold at each price.

Ticket price ($$x$)	22	23	35	40	53	55	58	61	69	73
Number of tickets sold (y)	8600	9100	7000	7600	5200	6000	4800	4500	2600	3000

(a) What type of correlation is shown by the data?

.... [1]

(b) Find the mean of the 10 ticket prices.

$ .... [1]

(c) **(i)** Find the equation of the regression line for y in terms of x.

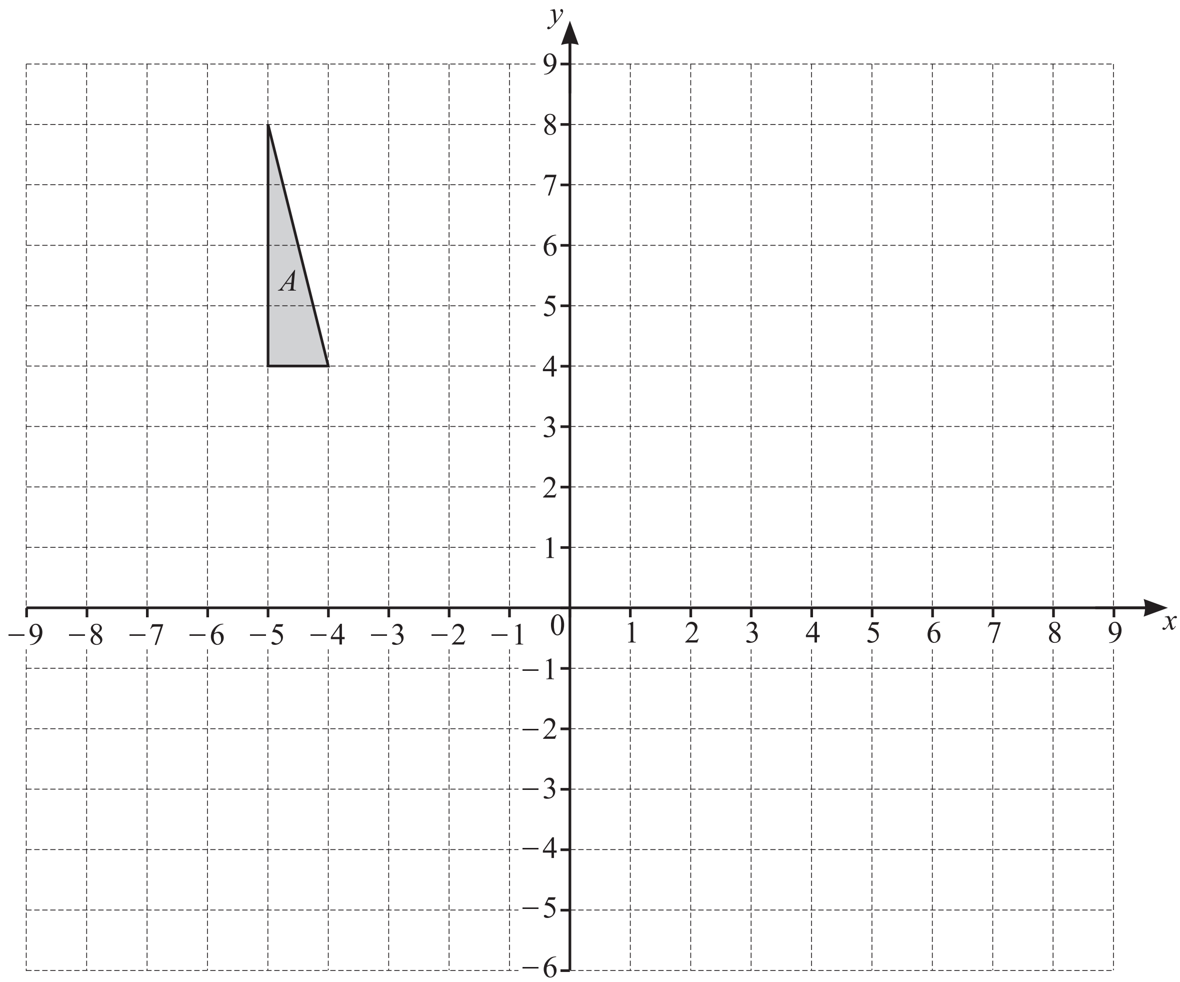
$y =$ .... [2]

(ii) The stadium decides to sell some tickets at a price of $45.

Use your answer to **part (i)** to estimate the number of tickets it will sell at this price.

.... [1]

2



(a) Translate triangle A with vector $\begin{pmatrix} -3 \\ -5 \end{pmatrix}$. Label the image B. [2]

(b) Describe fully the **single** transformation that maps triangle B onto triangle A.

....

.... [2]

(c) Rotate triangle A through 90° clockwise about (0, 0). Label the image C. [2]

(d) Reflect triangle A in the line $y = x$. Label the image D. [2]

(e) Describe fully the **single** transformation that maps triangle C onto triangle D.

....

.... [2]

3 Find the next term and the nth term in each of the following sequences.

(a) 13, 18, 23, 28, 33, …

next term = ...

nth term = ... [3]

(b) –9, –6, –1, 6, 15, …

next term = ...

nth term = ... [3]

(c) 1089, 2178, 3267, 4356, 5445, …

next term = ...

nth term = ... [2]

(d) 2, –4, 8, –16, 32, …

next term = ...

nth term = ... [3]

4 The marks, x, of 300 students in a chemistry test are shown in the table.

Mark (x)	Frequency
$0 < x \leqslant 10$	41
$10 < x \leqslant 20$	32
$20 < x \leqslant 30$	44
$30 < x \leqslant 40$	50
$40 < x \leqslant 60$	65
$60 < x \leqslant 80$	48
$80 < x \leqslant 100$	20

(a) Calculate an estimate of the mean mark.

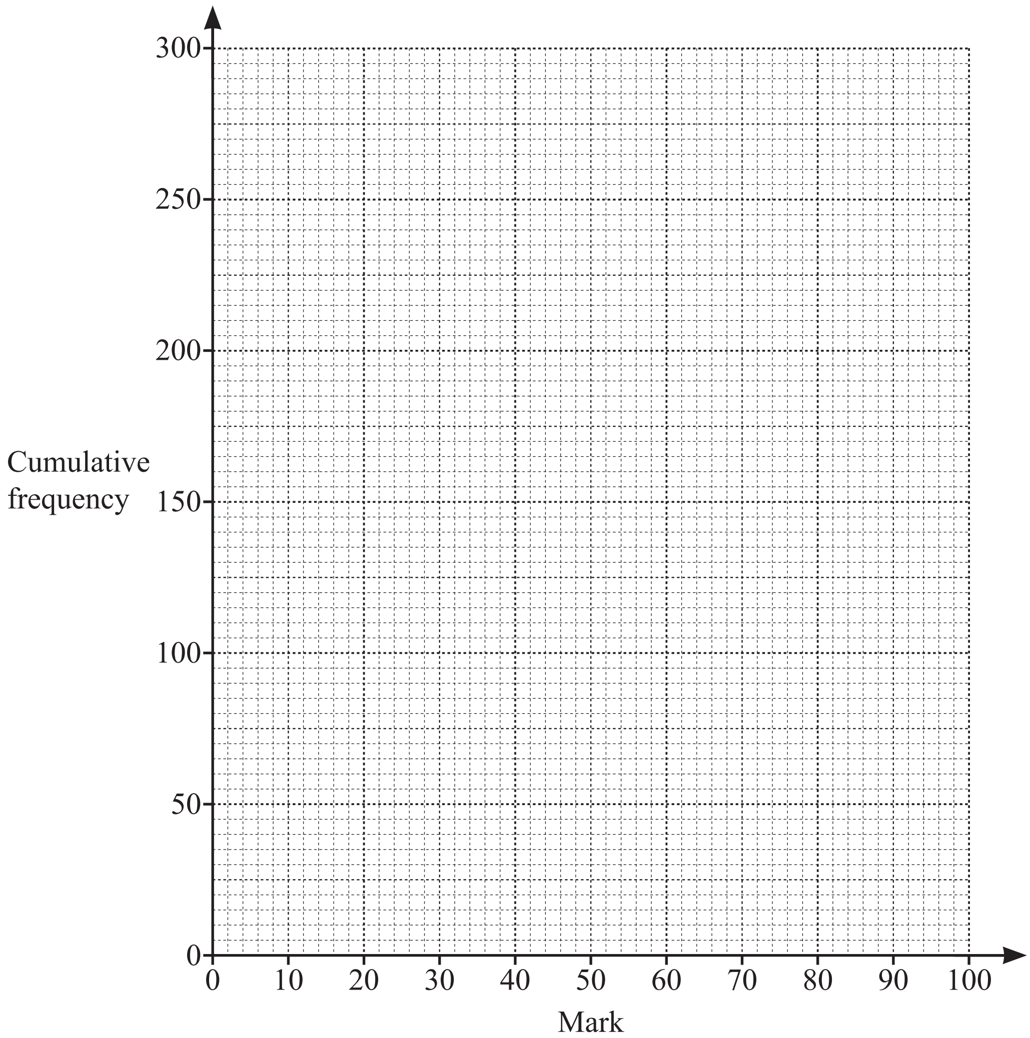
.... [2]

(b) Complete the cumulative frequency table.

Mark (x)	Cumulative frequency
$x \leqslant 10$	41
$x \leqslant 20$	
$x \leqslant 30$	
$x \leqslant 40$	
$x \leqslant 60$	
$x \leqslant 80$	
$x \leqslant 100$	300

[1]

(c) On the grid, draw a cumulative frequency curve.



[3]

(d) Use your curve in **part (c)** to find an estimate for

(i) the median mark,

.... [1]

(ii) the interquartile range.

.... [2]

(e) 35% of the students pass the test.

Use your curve in **part (c)** to find an estimate of the minimum mark needed to pass.

.... [2]

5 $\quad \mathrm{f}(x) = 2x - 1 \qquad \mathrm{g}(x) = 3 - x \qquad \mathrm{h}(x) = x^2$

(a) Find

(i) $\mathrm{f}(-2)$,

.... [1]

(ii) $\mathrm{h}(\mathrm{g}(-2))$.

.... [2]

(b) Solve $\mathrm{f}(x) = 7$.

$x =$ .... [2]

(c) Find $\mathrm{f}(\mathrm{g}(x))$.

.... [1]

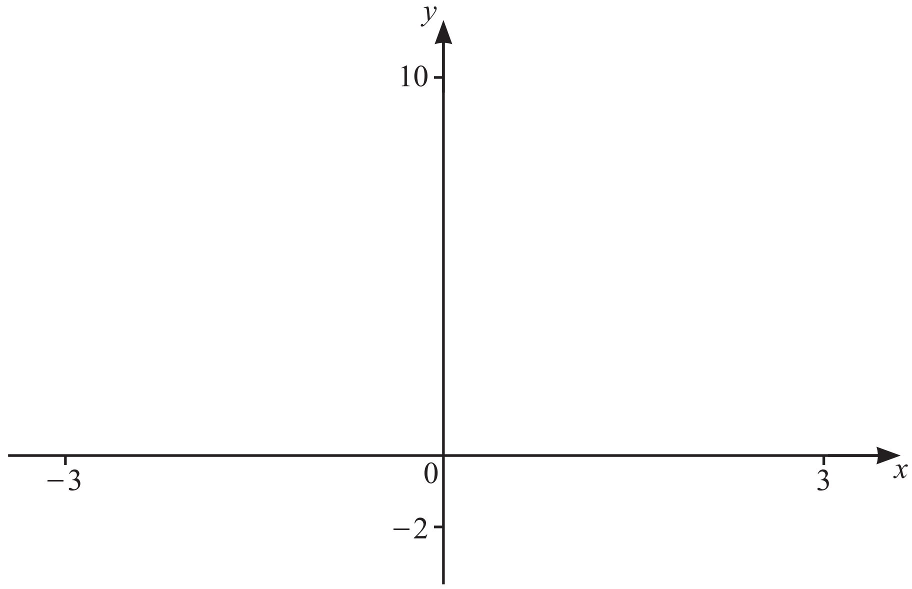
(d) Solve $\mathrm{f}(x) \times \mathrm{g}(x) + 2\mathrm{h}(x) = 0$.

$x =$ .... [3]

(e) Find $\mathrm{g}^{-1}(x)$.

$\mathrm{g}^{-1}(x) =$ .... [2]

(f)



(i) On the diagram, sketch the graph of $y = \mathrm{h}(x)$ for values of x between -3 and 3. [2]

(ii) Write down the equation of the line of symmetry of the graph of $y = \mathrm{h}(x)$.

.... [1]

(iii) On the diagram, sketch the graph of $y = \mathrm{g}(x)$ for values of x between -3 and 3. [1]

(iv) Solve $\mathrm{g}(x) > \mathrm{h}(x)$.

.... [2]

6 Piero invests \$5000 in Bank A and \$5000 in Bank B.

(a) Bank A pays simple interest at a rate of 6.5% each year.

(i) Find the total amount Piero has in Bank A at the end of 4 years.

\$ .... [3]

(ii) Find the number of complete years it takes for the total amount that Piero has in Bank A to be greater than \$10 000.

.... [3]

(b) Bank B pays compound interest at a rate of 4% each year.

(i) Find the total amount Piero has in Bank B at the end of 4 years.

\$ .... [2]

(ii) Find the number of complete years it takes for the total amount that Piero has in Bank B to be greater than \$10 000.

.... [4]

(c) By sketching suitable graphs, find the number of complete years it takes for the total amount that Piero has in Bank B to be greater than the total amount in Bank A.

.... [4]

7 **(a)** Solve the simultaneous equations.
You must show all your working.

$$7x + 2y = 8$$
$$2x - 3y = 13$$

$x =$ ....

$y =$ .... [4]

(b) Solve.

(i) $3x - 4 = -19$

$x =$ .... [2]

(ii) $15 - 5x = 7 - 3x$

$x =$ .... [2]

(iii) $\dfrac{28}{(x+1)} = -4$

$x =$ .... [2]

(c) $$3\log p - \log q - \log 8 = 2\log x$$

Find x in terms of p and q.

$x =$ .... [3]

8 Spinner A is numbered 2, 3, 4, 5, 6, 7.
Spinner B is numbered 2, 3, 4, 5.
Each spinner is equally likely to stop on any of its numbers.
The two spinners are each spun once and the number that each spinner stops on is recorded.

Find the probability that

(a) spinner A stops on a number less than 4,

.... [1]

(b) spinner B stops on 6,

.... [1]

(c) spinner A and spinner B both stop on the same number,

.... [2]

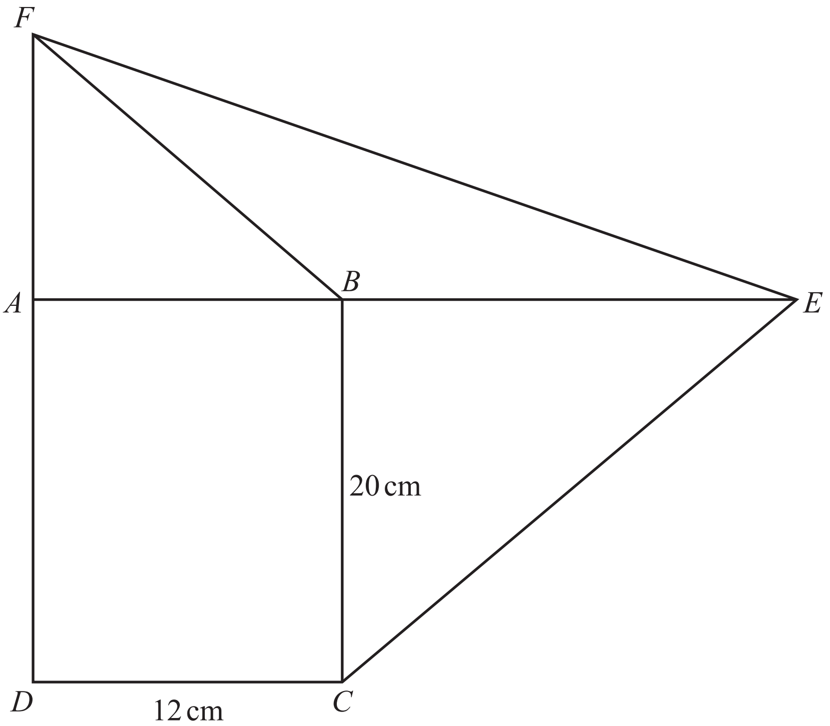
(d) one number is prime and one number is not prime,

.... [3]

(e) the sum of the numbers is a multiple of 3.

.... [2]

9



The diagram shows rectangle *ABCD* and two right-angled isosceles triangles, *ABF* and *BCE*.

(a) Find the perimeter of the quadrilateral *CDFE*.

.... cm [3]

(b) **(i)** Find the area of the quadrilateral *CDFE*.

.... cm^2 [3]

(ii) Quadrilateral Q is similar to quadrilateral *CDFE*.
The area of quadrilateral Q is 158 cm^2.

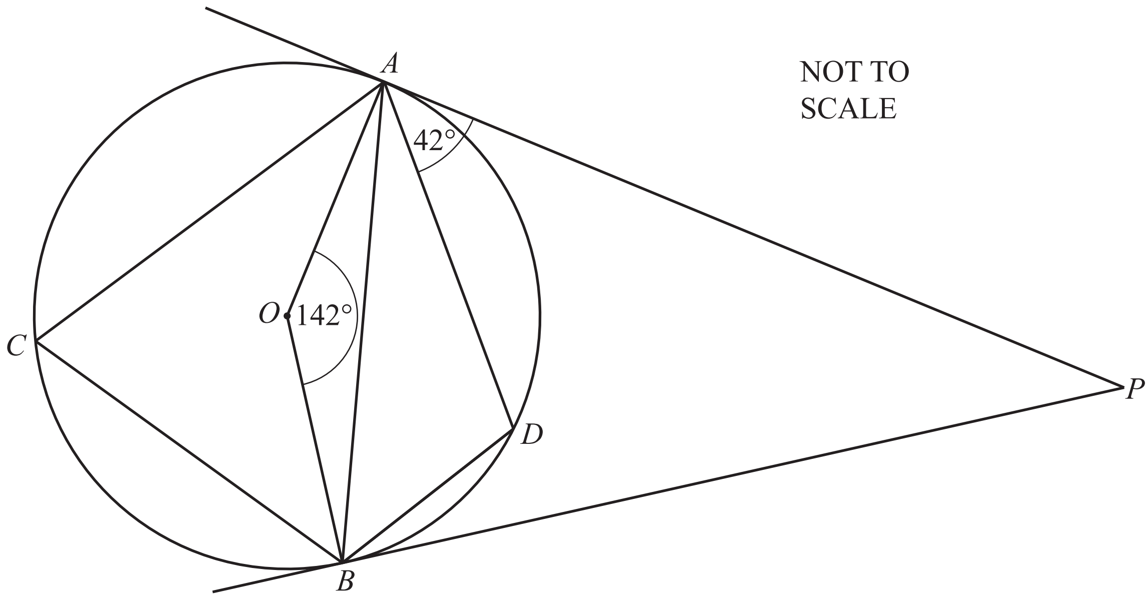
Find the length of the shortest side of quadrilateral Q.

.... cm [2]

(c) Calculate angle *AFE*.

Angle *AFE* = ... [2]

10



NOT TO SCALE

A, D, B and C lie on a circle, centre O.
AP is a tangent to the circle at A and BP is a tangent to the circle at B.
Angle $AOB = 142°$ and angle $DAP = 42°$.

(a) Find the value of

(i) angle ABD,

Angle ABD = ... [1]

(ii) angle ACB,

Angle ACB = ... [1]

(iii) angle ADB,

Angle ADB = ... [1]

(iv) angle BAD,

Angle BAD = ... [1]

(v) angle APB.

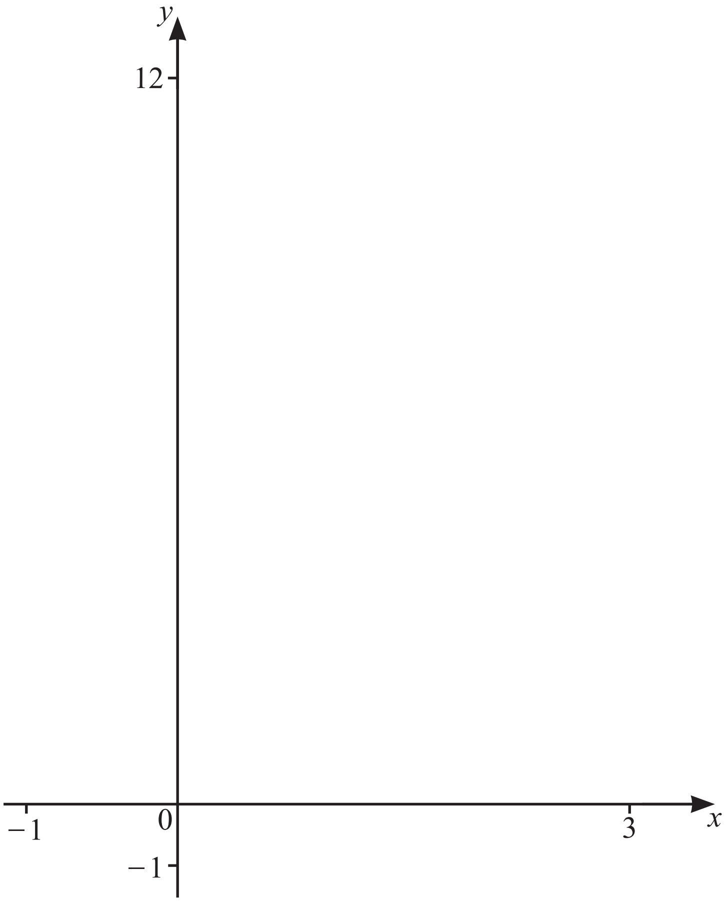
Angle APB = ... [1]

(b) The radius of the circle is 11 cm.

Find the area of triangle *ABD*.

.... cm^2 [5]

11 **(a)** Using a suitable sketch, solve $5^x = 10$.



$x =$ .... [3]

(b) Solve.

$$6x - 1 = \frac{5 + x}{2x + 3}$$

You must show all your working.

$x =$ .... or $x =$ .... [5]

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