**Cambridge International Examinations**
Cambridge International General Certificate of Secondary Education

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| CANDIDATE NAME | | | | | | | | | |
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*3410304642*

**CAMBRIDGE INTERNATIONAL MATHEMATICS** **0607/33**

Paper 3 (Core) **May/June 2018**

**1 hour 45 minutes**

Candidates answer on the Question Paper.

Additional Materials: Geometrical Instruments
Graphics Calculator

**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
Do not use staples, paper clips, glue or correction fluid.
You may use an HB pencil for any diagrams or graphs.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** the questions.
Unless instructed otherwise, give your answers exactly or correct to three significant figures as appropriate.
Answers in degrees should be given to one decimal place.
For $\pi$, use your calculator value.
You must show all the relevant working to gain full marks and you will be given marks for correct methods, including sketches, even if your answer is incorrect.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total number of marks for this paper is 96.



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## Formula List

| | |
|---|---|
| Area, $A$, of triangle, base $b$, height $h$. | $A = \frac{1}{2}bh$ |
| Area, $A$, of circle, radius $r$. | $A = \pi r^2$ |
| Circumference, $C$, of circle, radius $r$. | $C = 2\pi r$ |
| Curved surface area, $A$, of cylinder of radius $r$, height $h$. | $A = 2\pi rh$ |
| Curved surface area, $A$, of cone of radius $r$, sloping edge $l$. | $A = \pi rl$ |
| Curved surface area, $A$, of sphere of radius $r$. | $A = 4\pi r^2$ |
| Volume, $V$, of prism, cross-sectional area $A$, length $l$. | $V = Al$ |
| Volume, $V$, of pyramid, base area $A$, height $h$. | $V = \frac{1}{3}Ah$ |
| Volume, $V$, of cylinder of radius $r$, height $h$. | $V = \pi r^2 h$ |
| Volume, $V$, of cone of radius $r$, height $h$. | $V = \frac{1}{3}\pi r^2 h$ |
| Volume, $V$, of sphere of radius $r$. | $V = \frac{4}{3}\pi r^3$ |

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Answer **all** the questions.

**1** **(a)** Work out.

$3.6 + 2 \times 5.1$

..... [1]

**(b)** Find.

**(i)** $\sqrt{81}$

..... [1]

**(ii)** $81^2$

..... [1]

**(c)** Change $\frac{1}{4}$ to a decimal.

..... [1]

**(d)** Write 56.3942

**(i)** correct to 2 decimal places,

..... [1]

**(ii)** correct to 3 significant figures,

..... [1]

**(iii)** correct to the nearest 10.

..... [1]

**(e)** Calculate the **interest** received when

**(i)** \$600 is invested for 3 years at a rate of 2% per year simple interest,

\$ ..... [2]

**(ii)** \$600 is invested for 3 years at a rate of 2% per year compound interest.

\$ ..... [3]

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**2** Here is a list of numbers.

9 12 35 41 56

**(a)** From the list of numbers above, write down

**(i)** an even number,

..... [1]

**(ii)** a prime number.

..... [1]

**(b)** Charee picks one of the five numbers from the list above at random.

Find the probability that this number is

**(i)** an odd number,

..... [1]

**(ii)** a multiple of 4,

..... [1]

**(iii)** a factor of 18.

..... [1]

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**3** **(a)** Three brothers, Al, Bob and Cole, go to the cinema.
Their mother gives them \$60 to share in the ratio of their ages.

$$\text{Al : Bob : Cole} = 15 : 16 : 17$$

Al receives \$18.75 .

Show that Cole receives \$21.25 .

[2]

**(b)** Cinema tickets cost \$14 each.
Al, Bob and Cole each buy a cinema ticket.

Find how much money Al has left.

\$ ..... [1]

**(c)**

| | |
|---|---|
| Popcorn (large box) | \$3.50 |
| Popcorn (medium box) | \$2.50 |
| Popcorn (small box) | \$1.50 |
| Water | \$2.00 |
| Cola | \$2.50 |

After paying for his cinema ticket, Bob wants to buy a large box of popcorn and a cola.

Does he have enough money from his share of the \$60?
Show how you decide.

[3]

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**4** Here are the ages, in years, of 21 teachers.

| | | | | | | |
|---|---|---|---|---|---|---|
| 26 | 31 | 28 | 64 | 42 | 35 | 58 |
| 60 | 32 | 49 | 53 | 38 | 29 | 47 |
| 26 | 48 | 33 | 24 | 63 | 32 | 51 |

**(a)** Complete an ordered stem-and-leaf diagram, including the key, for these ages.

| | |
|---|---|
| | |
| | |
| | |
| | |

Key ..... | ..... represents ..... [3]

**(b)** For these ages, find

**(i)** the range,

..... [1]

**(ii)** the median,

..... [1]

**(iii)** the upper quartile,

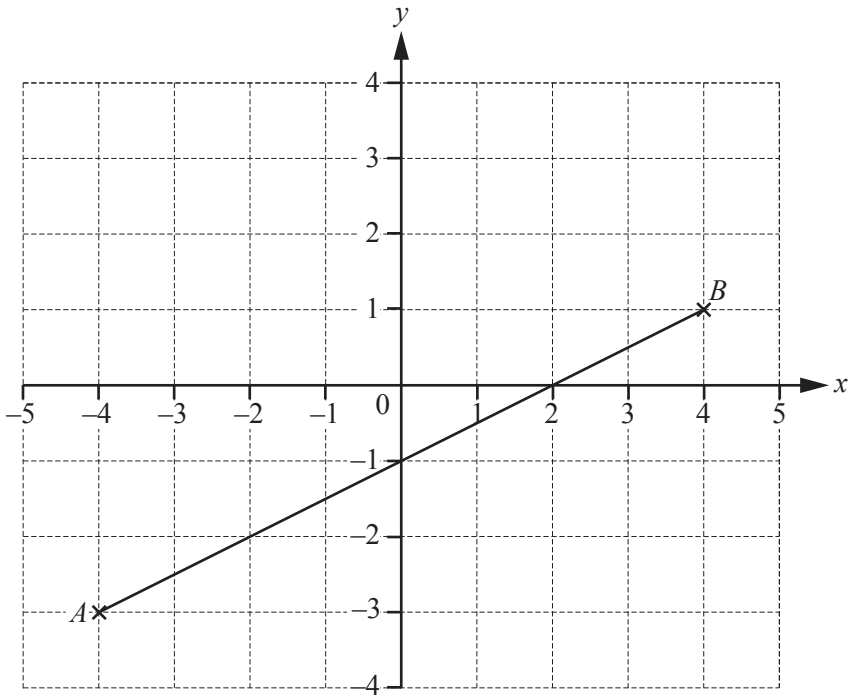
..... [1]

**(iv)** the inter-quartile range.

..... [1]

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**5**




**(a)** Write down the co-ordinates of point $A$ and point $B$.

$A$ (..... , .....)

$B$ (..... , .....) [2]

**(b)** Find the co-ordinates of the midpoint of $AB$.

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

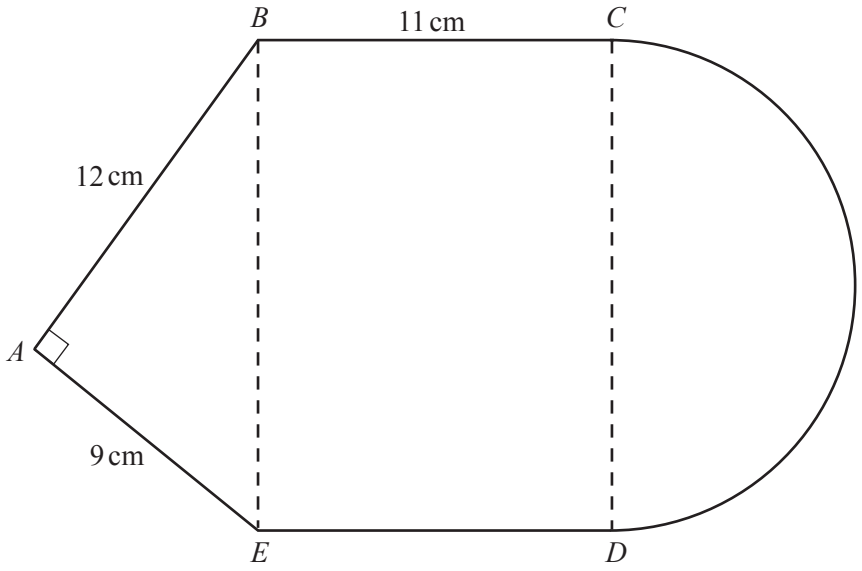
**(c)** Find the gradient of $AB$.

..... [2]

**(d)** Find the equation of the line $AB$.
Give your answer in the form $y = mx + c$.

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

**6** **(a)** A triangle, a rectangle and a semicircle are joined to form this shape.




*CD* is the diameter of the semicircle.

**(i)** Show that the length of *BE* is 15 cm.

[2]

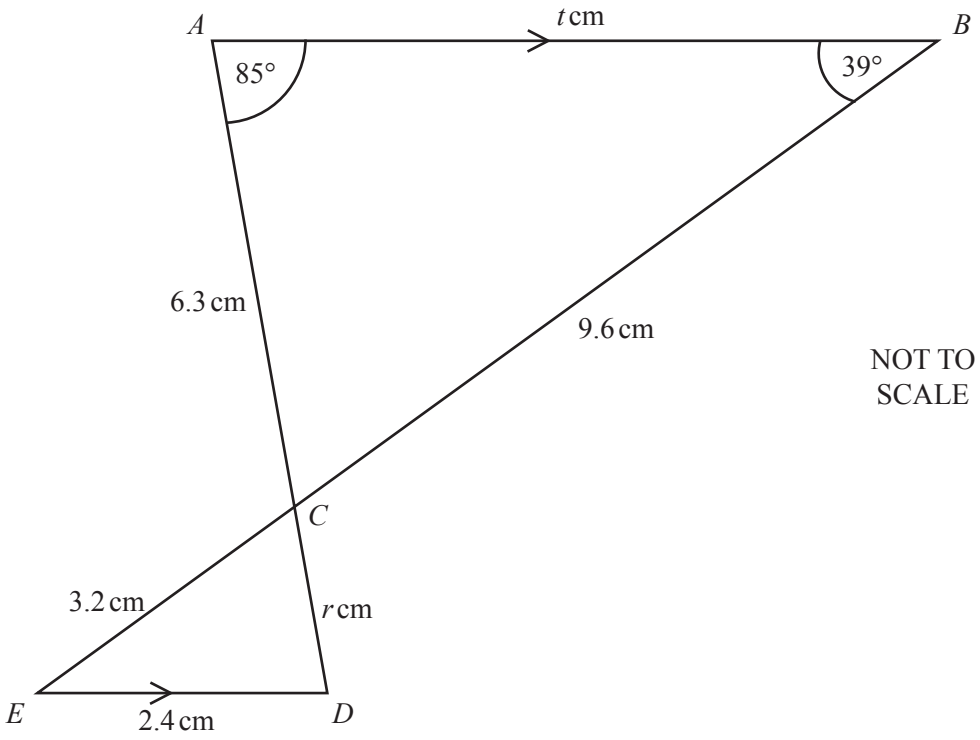
**(ii)** Find the perimeter of the shape *ABCDE*.

..... cm [3]

**(iii)** Find the total area of the shape *ABCDE*.

..... $cm^2$ [4]

**(b)** The diagram shows two **similar** triangles, *ABC* and *DEC*.




*AB* is parallel to *ED*.

**(i)** Find the value of *r* and the value of *t*.

*r* = .....

*t* = ..... [3]

**(ii)** Find angle *ACB*.

Angle *ACB* = ..... [1]

**(iii)** Find angle *CDE*.

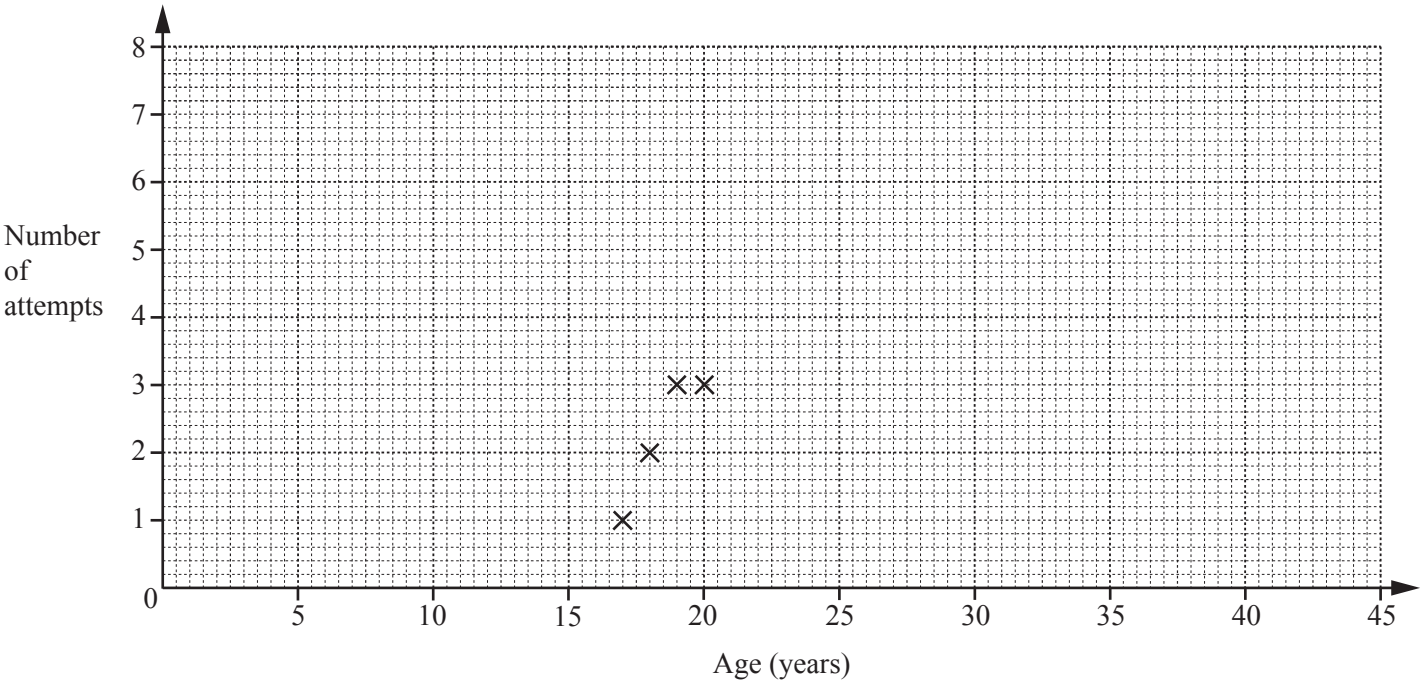
Angle *CDE* = ..... [1]

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**7** Eight people were asked their age and the number of attempts they took to pass their driving test. The results are shown in the table.

| Age (years) | 17 | 18 | 19 | 20 | 22 | 25 | 30 | 45 |
|---|---|---|---|---|---|---|---|---|
| Number of attempts | 1 | 2 | 3 | 3 | 6 | 5 | 4 | 8 |

**(a)** Complete the scatter diagram.
The first 4 points have been plotted for you.




[2]

**(b)** Find

**(i)** the mean age,

..... [1]

**(ii)** the mean number of attempts.

..... [1]

**(c) (i)** On the scatter diagram, plot the mean point. [1]

**(ii)** On the scatter diagram, draw a line of best fit. [2]

**(iii)** Use your line of best fit to estimate the number of attempts a 40 year old person might take to pass their driving test.

..... [1]

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**[Turn over**

**8** **(a)** Here are six Venn diagrams.

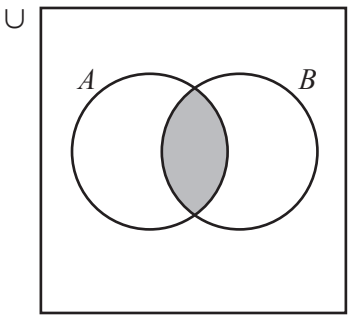



Diagram 1

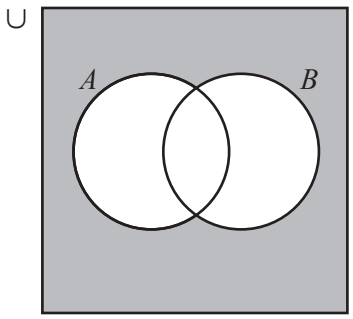



Diagram 2

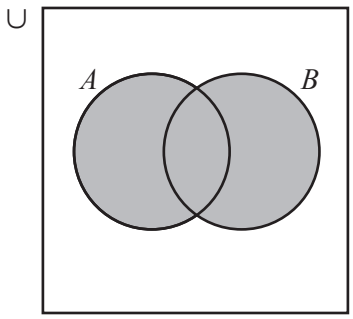



Diagram 3

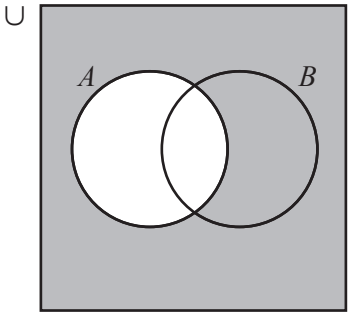



Diagram 4

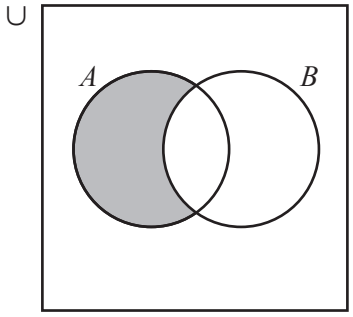



Diagram 5

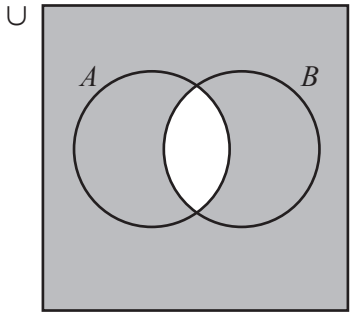



Diagram 6

Complete the table.

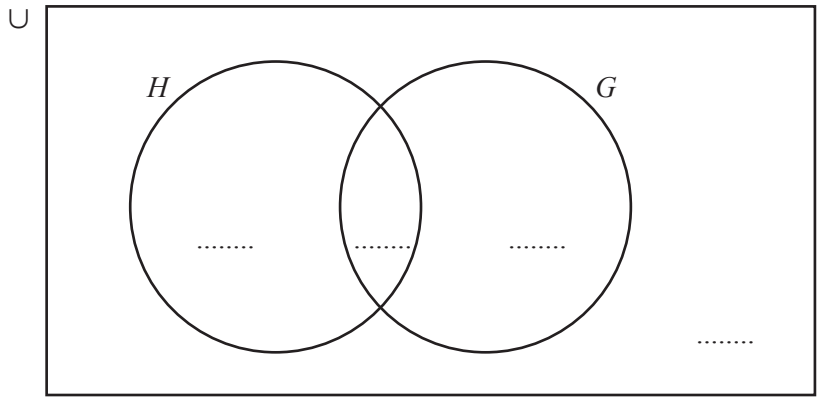
| Shaded area | Venn diagram number |
|---|---|
| $A \cup B$ | 3 |
| $A \cap B$ | |
| $A'$ | |
| $A \cap B'$ | |

[3]

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**(b) (i)** 20 students are asked if they study history ($H$) or geography ($G$).
10 study history, 12 study geography and 3 study both history and geography.

Complete the Venn diagram.



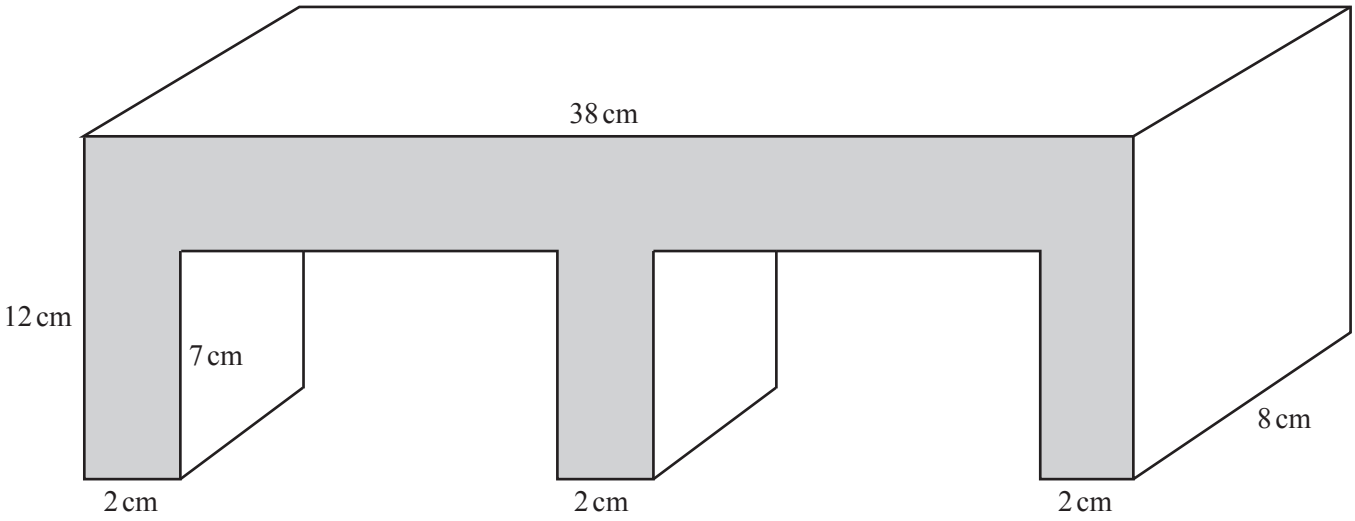

[3]

**(ii)** Write down the number of students who do not study history or geography.

..... [1]

**9** The diagram shows a bridge for a model train set.
The bridge is a cuboid with two identical tunnels.
Each tunnel is a cuboid.

NOT TO SCALE




**(a)** Find the shaded area.

.....cm$^2$ [4]

**(b)** Find the volume of the bridge.

.....cm$^3$ [2]

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**10** **(a)** Solve.

$3x + 8 = 2$

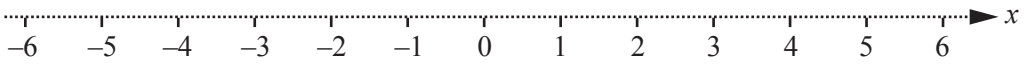
$x =$ ..... [2]

**(b)** **(i)** Solve.

$3 - 2x \leqslant 3$

..... [2]

**(ii)** Show your answer to **part (b)(i)** on the number line.




[1]

**(c)** Simplify.

$3a + 2b + a - 3b$

..... [2]

**(d)** Expand the brackets and simplify.

$(3x - 1)(2x + 4)$

..... [2]

**(e)** Factorise completely.

$x^2y^3 - 3x^2y$

..... [2]

**(f)** $P = 3a + 2b^2$

**(i)** Find the value of $P$ when $a = 2$ and $b = -1$.

$P =$ ..... [2]

**(ii)** Rearrange the formula to make $a$ the subject.

$a =$ ..... [2]

**Question 11 is printed on the next page.**

**11**




$f(x) = (2x-5)(x-8)$

**(a)** On the diagram, sketch the graph of $y = f(x)$ for $0 \leqslant x \leqslant 10$. [2]

**(b)** Find the co-ordinates of the point where the graph crosses the $y$-axis.

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

**(c)** Write down the $x$ co-ordinate of each point where the graph crosses the $x$-axis.

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

**(d)** Find the co-ordinates of the local minimum.

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

**(e)** $g(x) = 1.4^x - 10$

Find the $x$ co-ordinate of each point of intersection of $y = f(x)$ and $y = g(x)$.

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

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