CANDIDATE
NAME

CENTRE
NUMBER

CANDIDATE
NUMBER

CAMBRIDGE INTERNATIONAL MATHEMATICS 0607/03

Paper 3 (Core) **October/November 2013**

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, highlighters, glue or correction fluid.
You may use a 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 π, 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.

This document consists of **15** printed pages and **1** blank page.

[Turn over

Formula List

Area, A, of triangle, base b, height h. $A = \dfrac{1}{2}bh$

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. $V = \dfrac{1}{3}Ah$

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

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

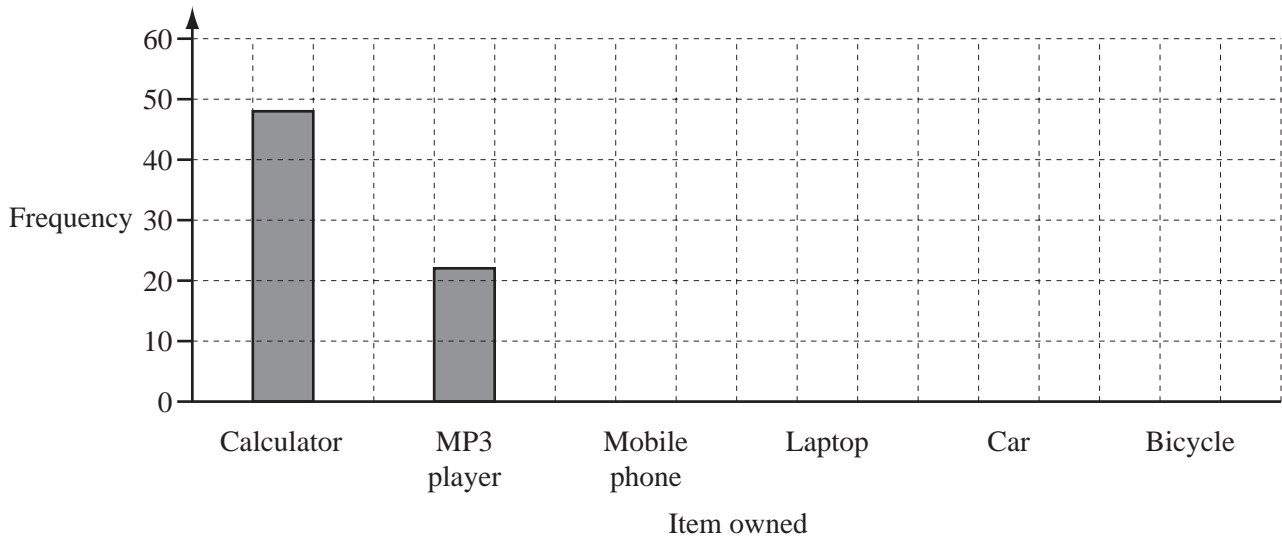Volume, V, of sphere of radius r. $V = \dfrac{4}{3}\pi r^3$

Answer **all** the questions.

1 Youming asked 50 of his friends which of these items they owned.
These are his results.

Item owned	Frequency
Calculator	48
MP3 player	22
Mobile phone	50
Laptop	35
Car	12
Bicycle	15

(a) Complete the bar chart to show this information.

[2]

(b) Write down the ratio

frequency of mobile phone : frequency of laptop : frequency of bicycle

Give your answer in its simplest form.

Answer(b) .... : .... : .... [2]

(c) One of Youming's 50 friends is chosen at random.
Write down the probability that this person owns

(i) a laptop,

Answer(c)(i) .... [1]

(ii) a mobile phone.

Answer(c)(ii) .... [1]

2 Three sisters, Meg, Jo and Pat, share $1400 .
Meg is 15 years old, Jo is 17 and Pat is 18.
They divide the money in the ratio of their ages.

(a) Show that Jo receives $476 .

[2]

(b) Find the amount that Pat receives.

Answer(b) $ .... [2]

(c) Work out how many more dollars Pat receives than Jo.

Answer(c) $ .... [1]

(d) Write your answer to **part (c)** as a percentage of the $1400.

Answer(d) .... % [2]

3 On any one night, the probability that José plays a computer game is 0.6 .
When José plays a computer game, the probability that he does his homework is 0.1 .
When he does not play a computer game, the probability that he does his homework is 0.8 .

(a) Complete the tree diagram.

José plays
a computer game

José does
his homework

0.6 — Yes

.... — Yes

.... — No

.... — No

.... — Yes

.... — No
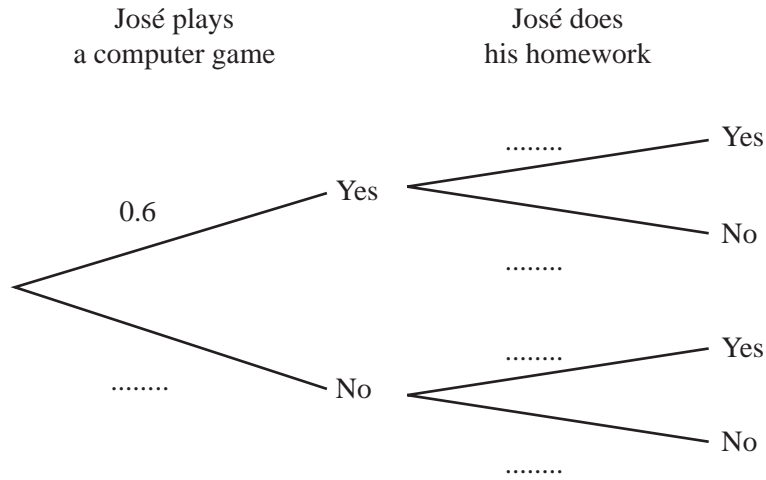
[3]

(b) Find the probability that José plays a computer game and does his homework.

Answer(b) .... [2]

(c) Find the probability that José does not do his homework.

Answer(c) .... [3]

4 Illyass asks 60 students how many minutes they spend on Facebook each week.
The information is shown in the table.

Number of minutes, x	Frequency
$0 < x \leqslant 20$	2
$20 < x \leqslant 40$	8
$40 < x \leqslant 60$	13
$60 < x \leqslant 80$	21
$80 < x \leqslant 100$	10
$100 < x \leqslant 120$	6

(a) Write down the midpoint of the interval $0 < x \leqslant 20$.

Answer(a) .... [1]

(b) Calculate an estimate of the mean number of minutes spent on Facebook.

Answer(b) .... min [2]

(c) Complete the cumulative frequency table.

Number of minutes, x	Cumulative Frequency
$x \leqslant 20$	2
$x \leqslant 40$	10
$x \leqslant 60$	
$x \leqslant 80$	
$x \leqslant 100$	54
$x \leqslant 120$	60

[1]

(d) Complete the cumulative frequency curve.
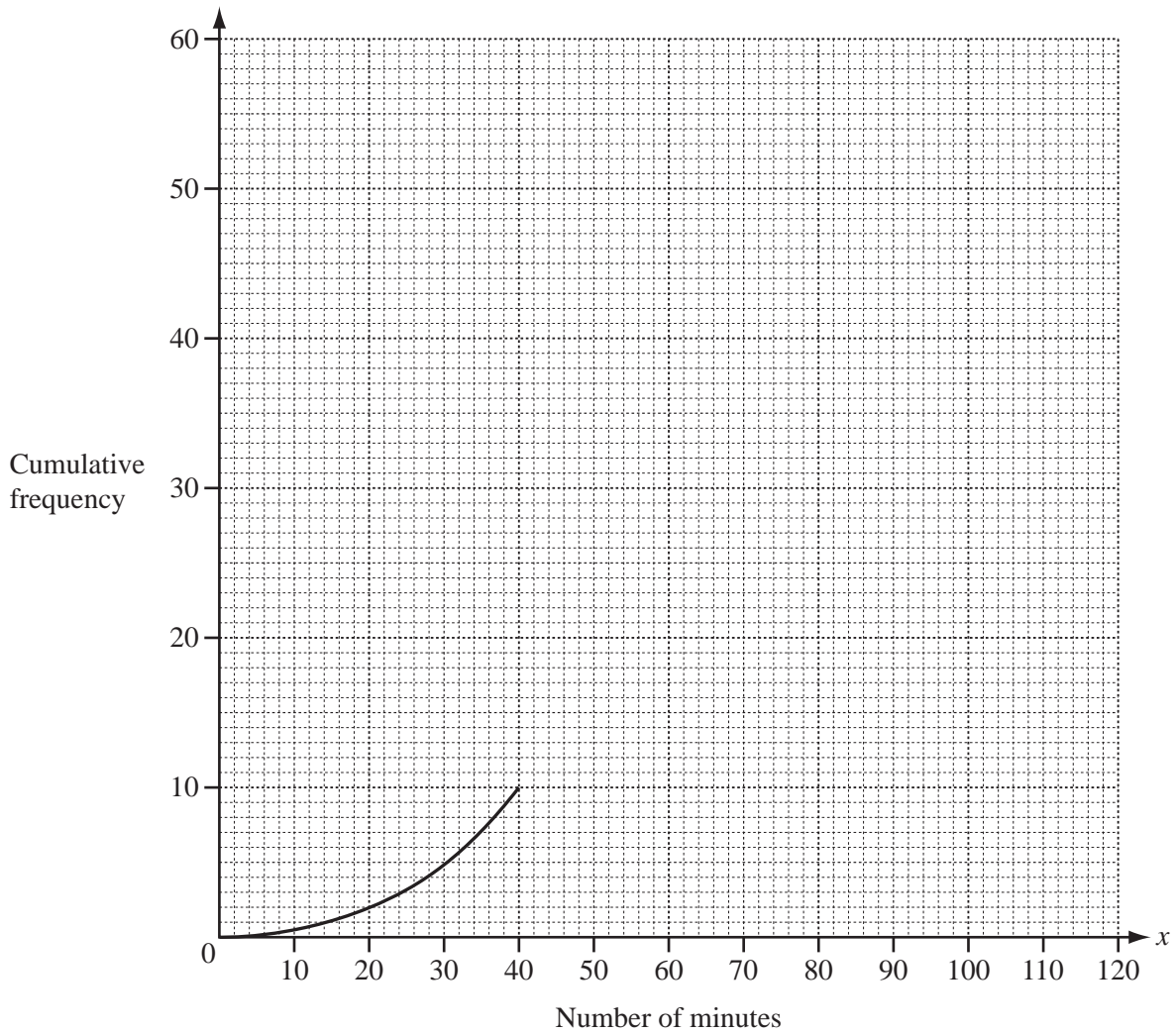
[2]

(e) Find the median.

Answer(e) .... min [1]

(f) Find the inter-quartile range.

Answer(f) .... min [2]

5 A pizza box has a height of 5 cm and a square base of side 30 cm.

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(a) (i) Find the area of the base of the box.

Answer(a)(i) .... cm^2 [1]

(ii) Calculate the volume of the box.

Answer(a)(ii) .... cm^3 [1]

(b)
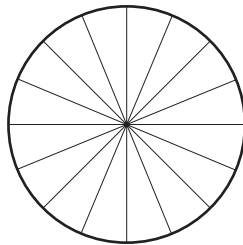
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The radius of the circular pizza is 15 cm.

(i) Find the area of the base of this pizza.

Answer(b)(i) .... cm^2 [1]

(ii) The pizza is cut into 16 equal slices as shown in the diagram.
Find the size of the angle of each slice.

Answer(b)(ii) .... [1]

(iii) Calculate the area of one slice of pizza.

Answer(b)(iii) .... cm^2 [1]

(c) A mathematically similar pizza box has height 4 cm.
Calculate the length of the sides of the base of this pizza box.

Answer(c) .... cm [2]

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6 Hugo, Ana and Bella all leave home at 07 45 to travel to school.

(a) Hugo lives 3 km from school.
He takes 20 minutes to skateboard to school.

    (i) Find the time that Hugo arrives at school.

Answer(a)(i) .... [1]

    (ii) Find his average speed in kilometres per hour.

Answer(a)(ii) .... km/h [2]

(b) Ana lives 1 km from school.
She walks to school at 4 km/h.

Find the time that Ana arrives at school.

Answer(b) .... [2]

(c) Bella travels to school by car at an average speed of 30 km/h.
She arrives at school at 08 10.
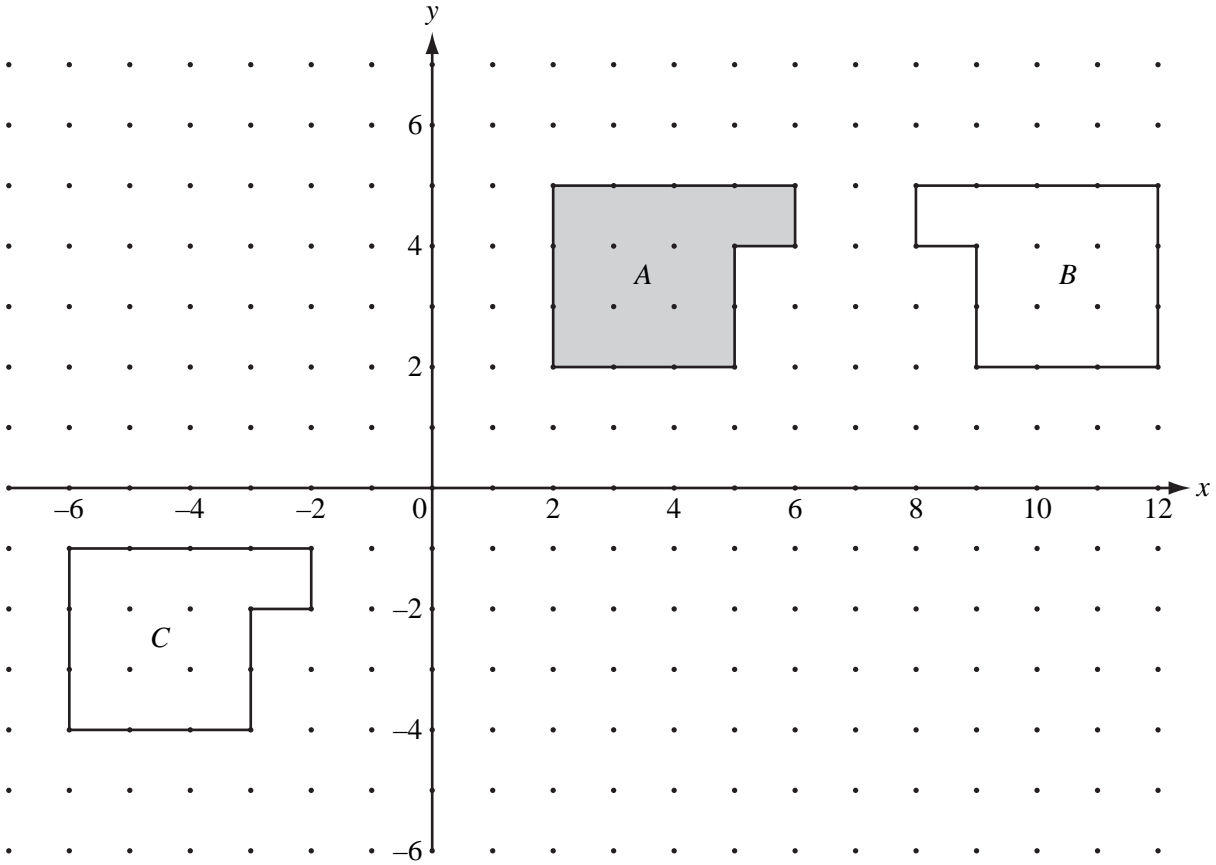
Find the distance Bella travels to school.

Answer(c) .... km [2]

(d) Which of these three students arrives at school first?

Answer(d) .... [1]

7

(a) Describe fully the **single** transformation that maps

   (i) shape *A* onto shape *B*,

   ....

   .... [2]

   (ii) shape *A* onto shape *C*.

   ....

   .... [2]

(b) Draw the reflection of shape *A* in the *y*-axis. [2]

8 Here are the first four terms of a sequence.

$$28 \quad 25 \quad 22 \quad 19$$
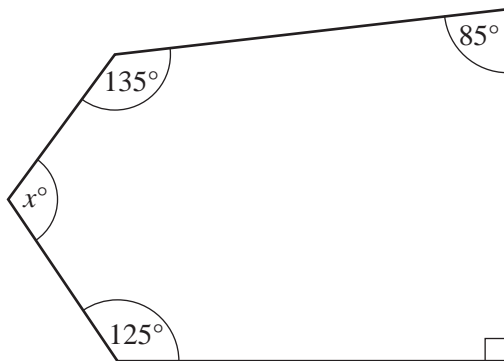
(a) Write down the next two terms of this sequence.

Answer(a) .... and .... [2]

(b) Find the *n*th term of the sequence.

Answer(b) .... [2]

9

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(a) Write down the mathematical name for this polygon.

Answer(a) .... [1]

(b) Work out the sum of the interior angles of a polygon with five sides.

Answer(b) .... [2]

(c) Find the size of the angle marked $x°$ in the diagram.

Answer(c) .... [2]

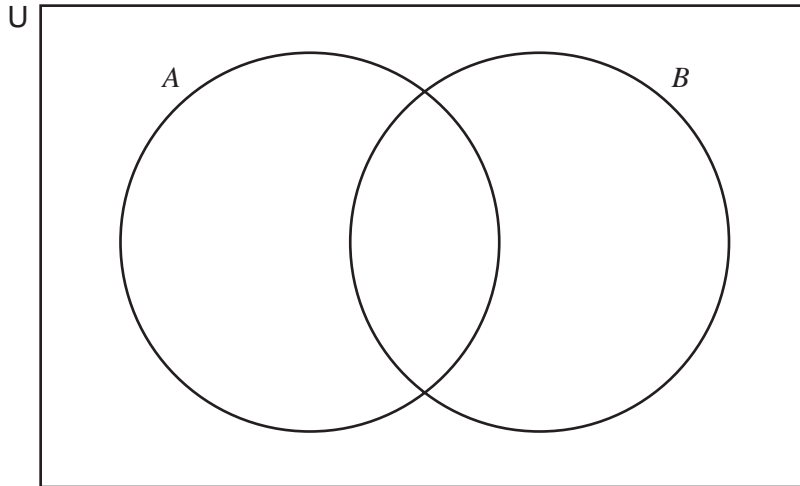**10** U = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12}
A is the set of factors of 12
B = {1, 3, 6, 10}

(a) Write down the six elements of set A.

Answer(a) .... [1]

(b) Complete the Venn diagram.

[2]

(c) Find the number of elements in

(i) $A \cap B$,

Answer(c)(i) .... [1]

(ii) $A' \cap B$,

Answer(c)(ii) .... [1]

(iii) $(A \cup B)'$.

Answer(c)(iii) .... [1]

11 The diagram shows a circular mirror, centre O and radius 25 cm.
It hangs by two wires, AB and AC.

AB and AC are tangents to the circular mirror.
AO is 60 cm.

A

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60 cm

B

C

25 cm

O
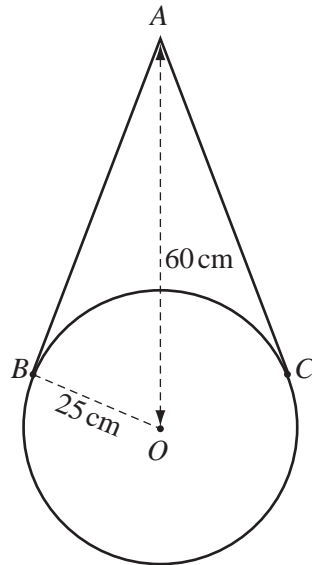
(a) Calculate the length of AB.

Answer(a) .... cm [3]

(b) Use trigonometry to find the size of angle BOC.

Answer(b) .... [3]

(c) Calculate the length of the arc BC.

Answer(c) .... cm [2]

12
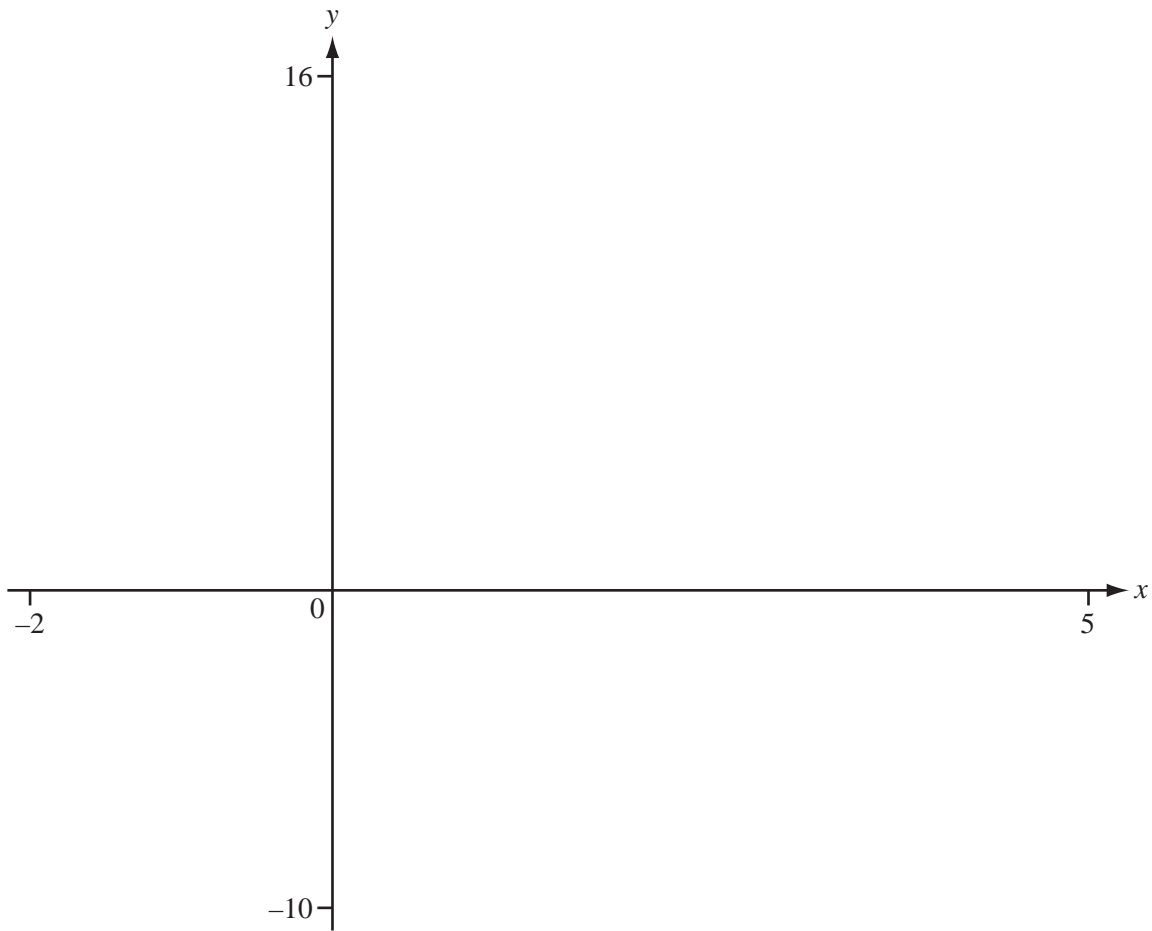
(a) On the diagram, sketch the graph of $y = f(x)$ where $f(x) = -2x^2 + 5x + 12$. [2]

(b) Write down the zeros of $f(x)$.

Answer(b) .... and .... [2]

(c) Find the co-ordinates of the maximum point.

Answer(c) (.................... , ...) [2]

(d) On the diagram, sketch the graph of $y = 2x + 5$. [1]

(e) Write down the x co-ordinates of the points of intersection of

$$y = -2x^2 + 5x + 12 \quad \text{and} \quad y = 2x + 5$$

Give your answers correct to two decimal places.

Answer(e) $x =$ .... and $x =$ .... [3]

13 **(a)** Simplify the following expressions.

(i) $2x - 1 + 2(x + 2)$

Answer(a)(i) .... [2]

(ii) $5p^3 \times 3p^4$

Answer(a)(ii) .... [2]

(iii) $\dfrac{6r^6}{4r^3}$

Answer(a)(iii) .... [2]

(iv) $(6t^4)^2$

Answer(a)(iv) .... [2]

(b) Factorise fully.

$$12p^2q + 18pq$$

Answer(b) .... [2]

(c) Make s the subject of the formula.

$$r = 2pm + ns$$

Answer(c) $s =$ .... [2]

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