Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

MATHEMATICS **0580/43**

Paper 4 (Extended) **October/November 2014**

2 hours 30 minutes

Candidates answer on the Question Paper.

Additional Materials: Electronic calculator
Tracing paper (optional)
Geometrical instruments

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.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
If working is needed for any question it must be shown below that question.
Electronic calculators should be used.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π, use either your calculator value or 3.142.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is 130.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **16** printed pages.

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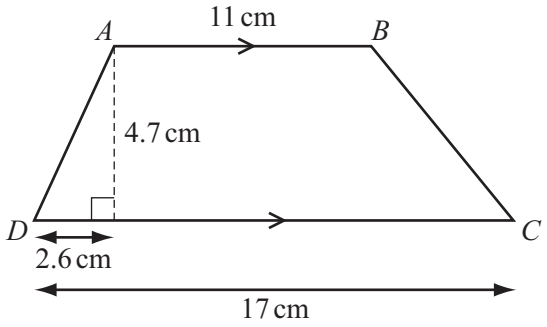
CAMBRIDGE International Examinations

1 **(a)** *ABCD* is a trapezium.

View solution



NOT TO SCALE

(i) Calculate the length of *AD*.

Answer(a)(i) *AD* = ... cm [2]

(ii) Calculate the size of angle *BCD*.

View solution

Answer(a)(ii) Angle *BCD* = ... [3]

(iii) Calculate the area of the trapezium *ABCD*.

View solution

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

(b) A **similar** trapezium has perpendicular height 9.4 cm.

View solution

Calculate the area of this trapezium.

Answer(b) ..... cm^2 [3]

2 There are three different areas, A, B and C, for seating in a theatre.
The numbers of seats in each area are in the ratio $A : B : C = 11 : 8 : 7$.
There are 920 seats in area B.

(a) (i) Show that there are 805 seats in area C.

View solution

Answer(a)(i)

[1]

(ii) Write the number of seats in area B as a percentage of the total number of seats.

View solution

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

(b) The cost of a ticket for a seat in each area of the theatre is shown in the table.

View solution

Area A	\$11.50
Area B	\$15
Area C	\$22.50

For a concert 80% of area B tickets were sold and $\frac{3}{5}$ of area C tickets were sold.
The total amount of money taken from ticket sales was \$35 834.

Calculate the number of area A tickets that were sold.

Answer(b) ..... [5]

(c) The total ticket sales of \$35 834 was 5% less than the ticket sales at the previous concert.

View solution

Calculate the ticket sales at the previous concert.

Answer(c) \$..... [3]

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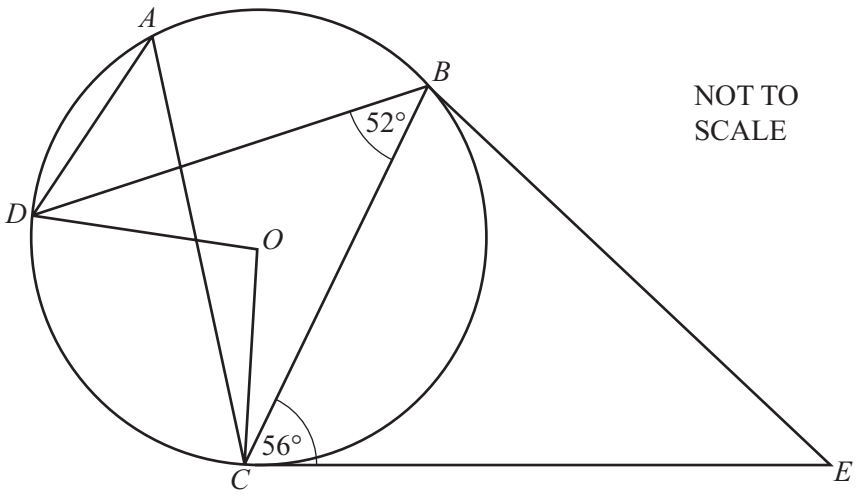
3



A, *B*, *C* and *D* are points on a circle, centre *O*.
CE is a tangent to the circle at *C*.

View solution

(a) Find the sizes of the following angles and give a reason for each answer.

(i) Angle *DAC* = ... because .....

..... [2]

(ii) Angle *DOC* = ... because .....

..... [2]

(iii) Angle *BCO* = ... because .....

..... [2]

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(b) $CE = 8.9\,\text{cm}$ and $CB = 7\,\text{cm}$.

View solution

(i) Calculate the length of BE.

Answer(b)(i) BE = ... cm [4]

(ii) Calculate angle BEC.

View solution

Answer(b)(ii) Angle BEC = ... [3]

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4 Yeung and Ariven compete in a triathlon race.

The probability that Yeung finishes this race is $\frac{3}{5}$.

The probability that Ariven finishes this race is $\frac{2}{3}$.

(a) (i) Which of them is more likely to finish this race?
Give a reason for your answer.

View solution

Answer(a)(i) ..... because .....

..... [1]

(ii) Find the probability that they both finish this race.

View solution

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

(iii) Find the probability that only one of them finishes this race.

View solution

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

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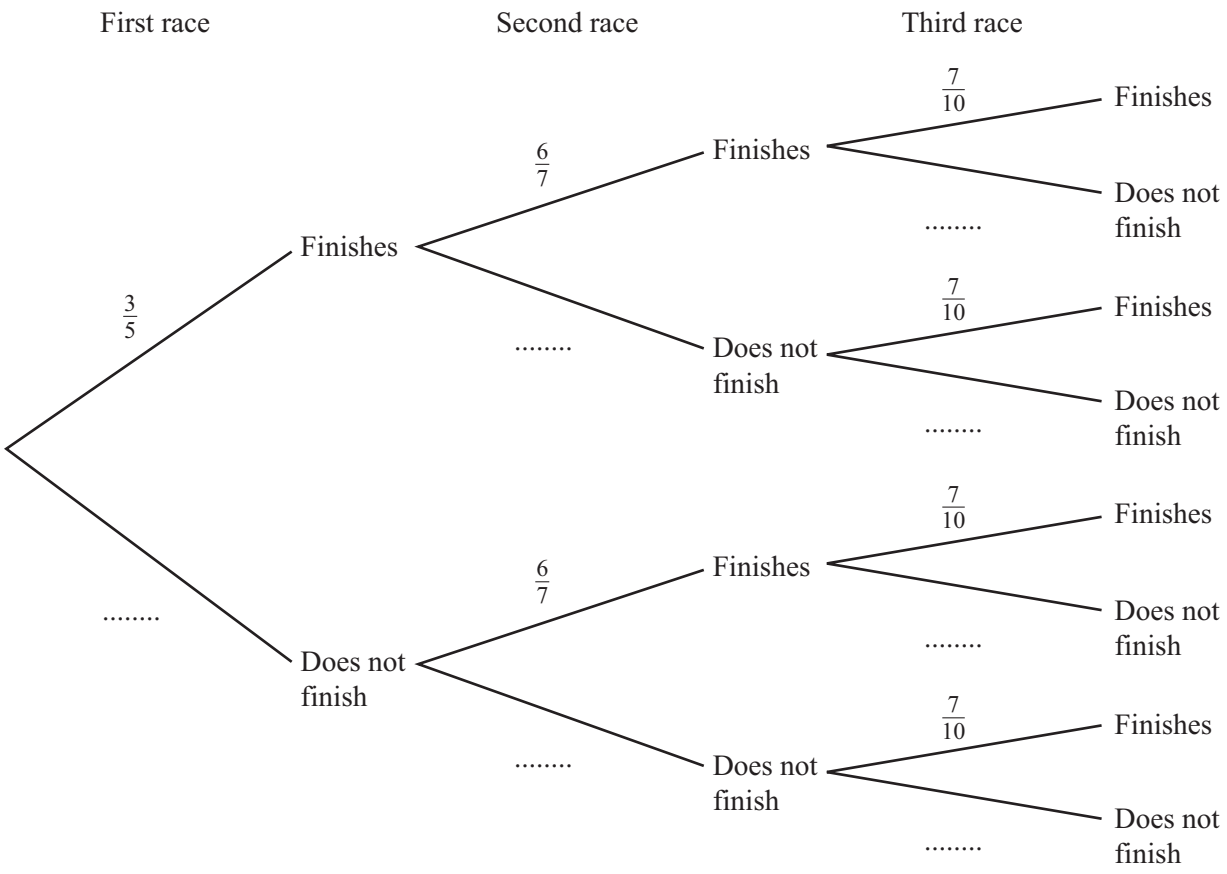
(b) After the first race, **Yeung** competes in two further triathlon races.

View solution

(i) Complete the tree diagram.



[3]

(ii) Calculate the probability that Yeung finishes all three of his races.

View solution

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

(iii) Calculate the probability that Yeung finishes at least one of his races.

View solution

Answer(b)(iii) ..... [3]

5 $\mathbf{P} = \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$ $\mathbf{Q} = \begin{pmatrix} 1 & -2 \\ 0 & 1 \end{pmatrix}$ $\mathbf{R} = \begin{pmatrix} -3 \\ 5 \end{pmatrix}$

View solution

(a) Work out

(i) $4\mathbf{P}$,

Answer(a)(i) [1]

View solution

(ii) $\mathbf{P} - \mathbf{Q}$,

Answer(a)(ii) [1]

View solution

(iii) $\mathbf{P}^2$,

Answer(a)(iii) [2]

View solution

(iv) $\mathbf{QR}$.

Answer(a)(iv) [2]

View solution

(b) Find the matrix $\mathbf{S}$, so that $\mathbf{QS} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$.

Answer(b) [3]

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6 **(a)** Simplify.

(i) $x^3 \div \frac{3}{x^5}$

View solution

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

(ii) $5xy^8 \times 3x^6y^{-5}$

View solution

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

(iii) $(64x^{12})^{\frac{2}{3}}$

View solution

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

(b) Solve $3x^2 - 7x - 12 = 0$.
Show your working and give your answers correct to 2 decimal places.

View solution

Answer(b) x = ... or x = ... [4]

(c) Simplify $\frac{x^2 - 25}{x^3 - 5x^2}$.

View solution

Answer(c) ..... [3]

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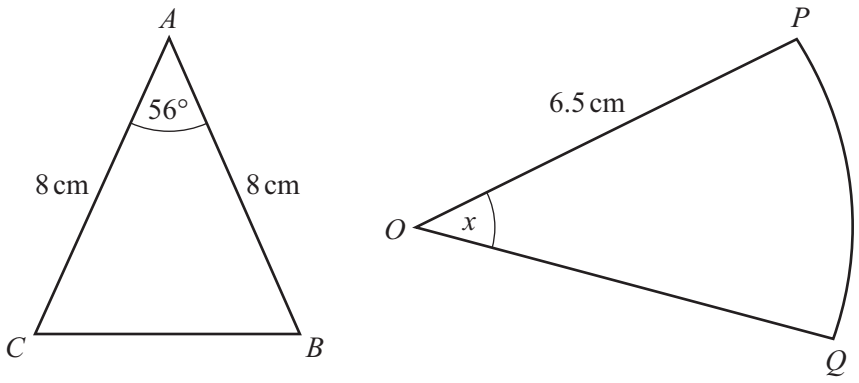

NOT TO SCALE

The diagram shows a triangle and a sector of a circle.
In triangle ABC, $AB = AC = 8$ cm and angle $BAC = 56°$.
Sector OPQ has centre O, sector angle x and radius 6.5 cm.

(a) Show that the area of triangle ABC is 26.5 cm^2 correct to 1 decimal place.

View solution

Answer(a)

[2]

(b) The area of sector OPQ is equal to the area of triangle ABC.

View solution

(i) Calculate the sector angle x.

Answer(b)(i) ..... [3]

(ii) Calculate the perimeter of the sector OPQ.

View solution

Answer(b)(ii) ..... cm [3]

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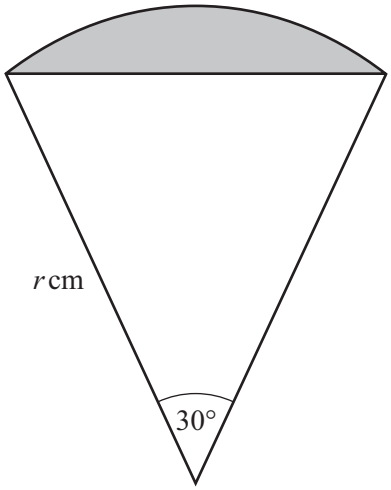
(c) The diagram shows a sector of a circle, radius r cm.

View solution



NOT TO SCALE

(i) Show that the area of the shaded segment is $\frac{1}{4}r^2\left(\frac{1}{3}\pi - 1\right)$ cm^2.

Answer(c)(i)

[4]

View solution

(ii) The area of the segment is 5 cm^2.

Find the value of r.

Answer(c)(ii) r = ... [3]

8 **(a)** A straight line joins the points (–1, –4) and (3, 8).

View solution

(i) Find the midpoint of this line.

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

(ii) Find the equation of this line.
Give your answer in the form $y = mx + c$.

View solution

Answer(a)(ii) y = ... [3]

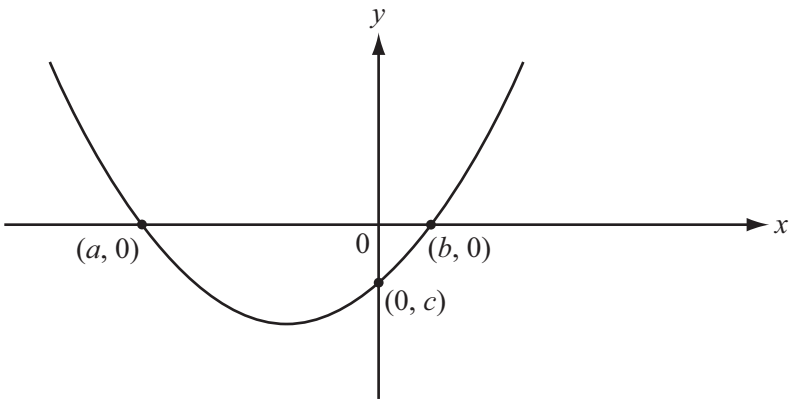
(b) **(i)** Factorise $x^2 + 3x - 10$.

View solution

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

(ii) The graph of $y = x^2 + 3x - 10$ is sketched below.

View solution



NOT TO SCALE

Write down the values of a, b and c.

Answer(b)(ii) a = ...

b = ...

c = ... [3]

(iii) Write down the equation of the line of symmetry of the graph of $y = x^2 + 3x - 10$.

View solution

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

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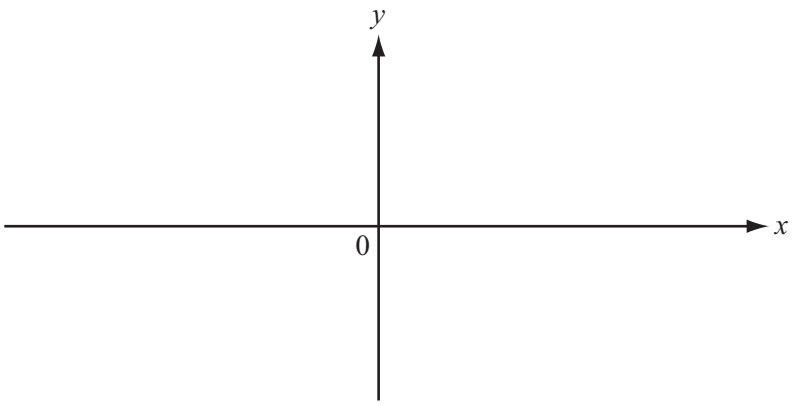
(c) Sketch the graph of $y = 18 + 7x - x^2$ on the axes below.
Indicate clearly the values where the graph crosses the x and y axes.

View solution



NOT TO SCALE

[4]

(d) (i) $x^2 + 12x - 7 = (x + p)^2 - q$

View solution

Find the value of p and the value of q.

Answer(d)(i) p = ...

q = ... [3]

(ii) Write down the minimum value of y for the graph of $y = x^2 + 12x - 7$.

View solution

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

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9 **(a)** Ricardo asks some motorists how many litres of fuel they use in one day.
The numbers of litres, correct to the nearest litre, are shown in the table.

View solution

Number of litres	16	17	18	19	20
Number of motorists	11	10	p	4	8

(i) For this table, the mean number of litres is 17.7 .

Calculate the value of p.

Answer(a)(i) p = ... [4]

(ii) Find the median number of litres.

View solution

Answer(a)(ii) ..... litres [1]

(b) Manuel completed a journey of 320 km in his car.
The fuel for the journey cost $1.28 for every 6.4 km travelled.

View solution

(i) Calculate the cost of fuel for this journey.

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

(ii) When Manuel travelled 480 km in his car it used 60 litres of fuel.
Manuel's car used fuel at the same rate for the journey of 320 km.

View solution

Calculate the number of litres of fuel the car used for the journey of 320 km.

Answer(b)(ii) ..... litres [2]

(iii) Calculate the cost per litre of fuel used for the journey of 320 km.

View solution

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

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(c) Ellie drives a car at a constant speed of 30 m/s correct to the nearest 5 m/s.
She maintains this speed for 5 minutes correct to the nearest 10 seconds.

View solution

Calculate the upper bound of the distance in **kilometres** that Ellie could have travelled.

Answer(c) ..... km [5]

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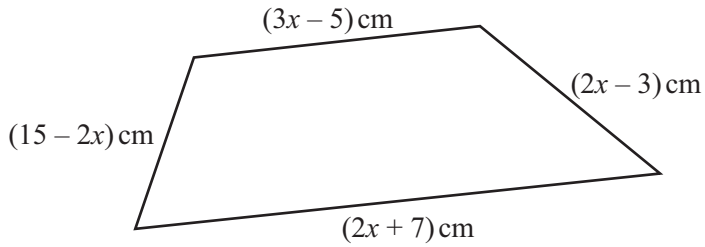
10 (a)

View solution



NOT TO SCALE

(i) Write an expression, in terms of x, for the perimeter of the quadrilateral.
Give your answer in its simplest form.

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

(ii) The perimeter of the quadrilateral is 32 cm.

View solution

Find the length of the longest side of the quadrilateral.

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

Question 10(b) is printed on the next page.

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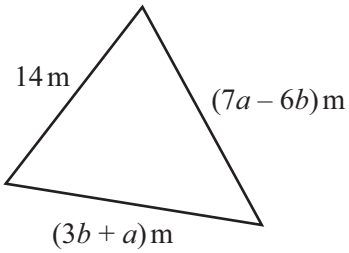
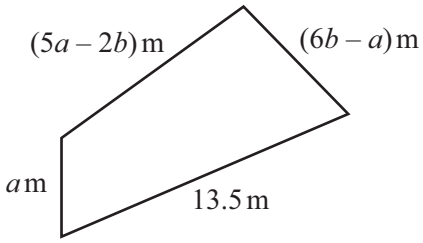
(b)





NOT TO SCALE

View solution

The triangle has a perimeter of 32.5 m.
The quadrilateral has a perimeter of 39.75 m.

Write two equations in terms of a and b and simplify them.
Use an algebraic method to find the values of a and b.
Show all your working.

Answer(b) a = ...

b = ... [6]

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