UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

0918791694

MATHEMATICS **0581/32**

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

2 hours

Candidates answer on the Question Paper.

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

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 a pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, 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.

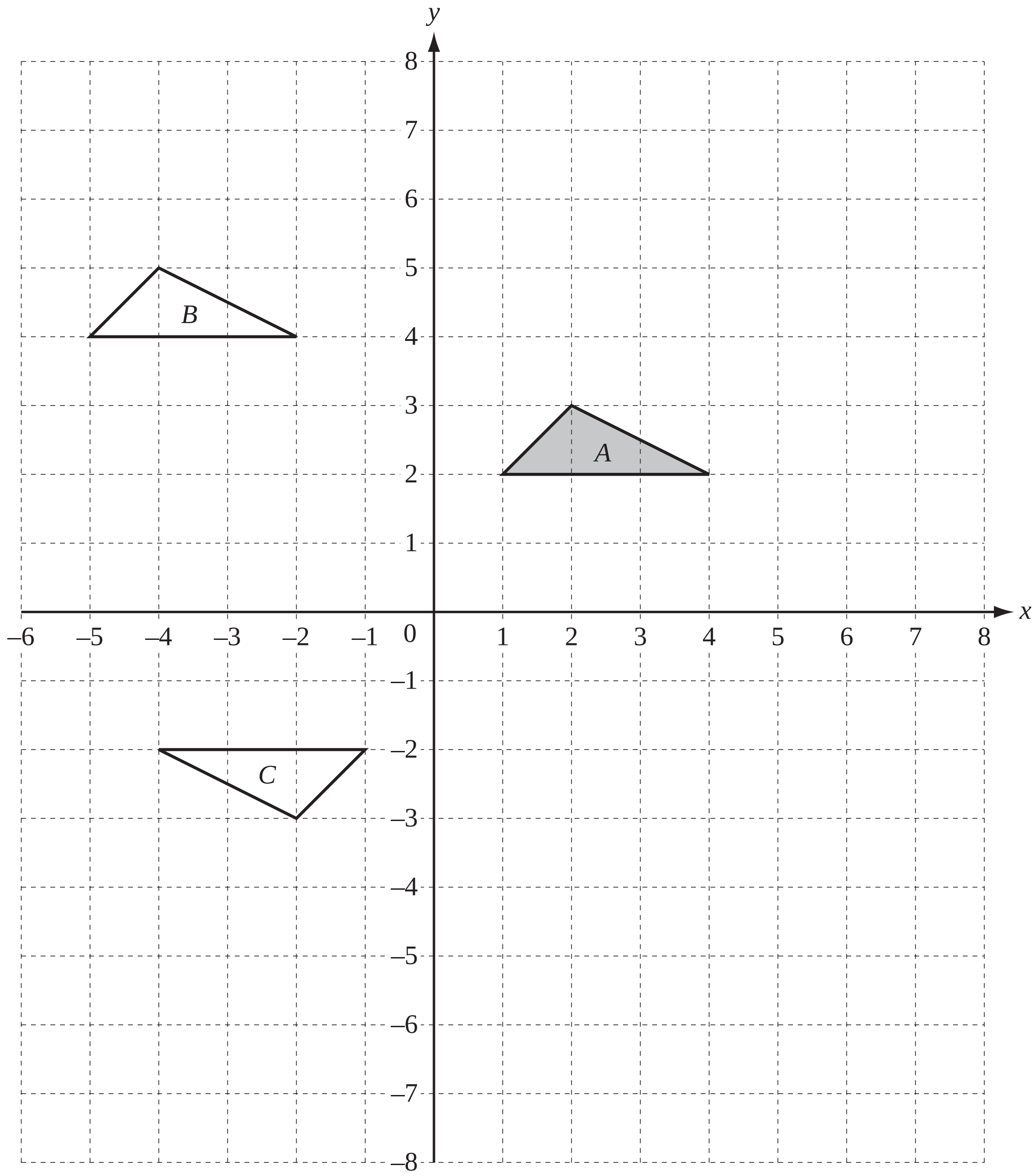
At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is 104.

IB13 11_0581_32/FP

UNIVERSITY *of* CAMBRIDGE
International Examinations

For Examiner's Use

1



Triangles *A*, *B* and *C* are shown on a 1 cm^2 grid.

(a) Write down the mathematical name for triangle *A*.

Answer(a) .... [1]

(b) Complete the following statement.

Triangles *A*, *B* and *C* are .... triangles because they are the same shape and size.
[1]

For Examiner's Use

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

(i) triangle A onto triangle B,

Answer(c)(i) ....

.... [2]

(ii) triangle A onto triangle C.

Answer(c)(ii) ....

.... [3]

(d) Reflect triangle A in the x-axis.
Label the image P. [1]

(e) Enlarge triangle A, scale factor 2, centre (0, 0).
Label the image Q. [2]

(f) Calculate the area of triangle Q.

Answer(f) .... cm^2 [2]

For Examiner's Use

2 Ravi sells cars.

(a) He has a total of 144 cars for sale.

(i) 64 of these cars are 3 or more years old.

What fraction of the cars are **less than** 3 years old?
Give your answer in its simplest form.

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

(ii) Some of the 144 cars use petrol, some use diesel and some are electric cars.
The ratio of petrol to diesel to electric cars is 6 : 5 : 1 .

Work out the number of these cars that use diesel.

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

(b) Lola buys a car from Ravi.

There are two ways she can pay for the car.

Option 1: one payment of \$5200 .

Option 2: a payment of $\frac{2}{5}$ of \$5200 plus 24 monthly payments, each of \$175 .

Work out how much **more** Lola pays using Option 2 than Option 1.

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

(c) For one week, Ravi reduces all his car prices by 15%.
The price of a car was \$3450.

Show that the reduced price of the car is \$2932.50 .

Answer(c)

[2]

(d) Ravi buys a car for \$2500 .
He sells it for \$3300 .

Calculate his percentage profit.

Answer(d) .... % [3]

For Examiner's Use

3 **(a)** Sweets are sold in packets.
There are n sweets in each packet.

(i) Maya has 4 packets of sweets and 21 extra sweets.

Write an expression, in terms of n, for the number of sweets Maya has.

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

(ii) Tassos has $5n + 3$ sweets.
Roma has $3n + 27$ sweets.
Tassos and Roma each have the same number of sweets.

Write down an equation, in terms of n, and solve it.

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

(iii) Work out the number of sweets Tassos and Roma have altogether.

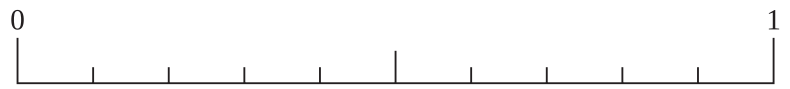
Answer(a)(iii) .... [1]

(b) A different packet of sweets contains 6 red sweets, 10 yellow sweets and 4 green sweets.
Simon takes one sweet from the packet at random.

(i) Write down the colour of sweet Simon is most likely to take.

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

(ii) On the probability scale, draw an arrow to show the probability that Simon's sweet is yellow.



[1]

(iii) Write down the probability that Simon's sweet is green.

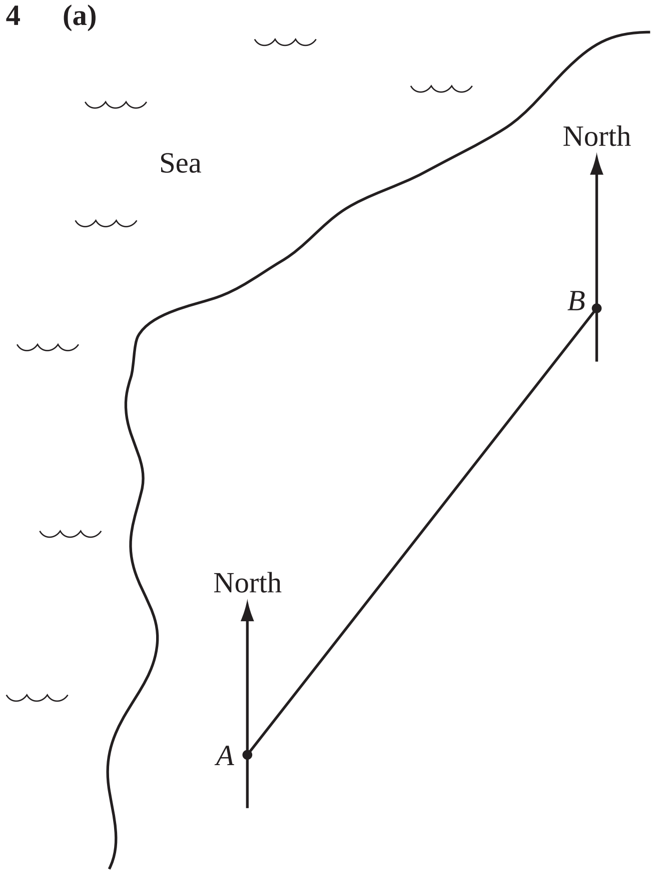
Answer(b)(iii) .... [1]

(iv) Write down the probability that Simon's sweet is red or yellow.

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

For Examiner's Use

4 (a)



The scale drawing shows the position of two airfields, *A* and *B*.
The scale is 1 cm represents 50 km.

(i) Find the actual distance between *A* and *B*.
Give your answer in kilometres.

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

(ii) Measure the bearing of *B* from *A*.

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

(iii) A third airfield, *C*, is 525 km from airfield *A* and 350 km from airfield *B*.

On the scale drawing, construct the position of airfield *C*. [2]

(iv) Measure the bearing of *B* from *C*.

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

For Examiner's Use

(b) A plane is at airfield C at 10 40.
It flies 525 km to airfield A at a speed of 700 km/h.

Work out the time when the plane reaches airfield A.

Answer(b) .... [3]

(c) This plane has a maximum take-off weight of 4173 kg.

Write 4173 kg correct to the nearest hundred kilograms.

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

(d) The plane can fly at a maximum height of 13 107 m.

Write 13 107 m in **kilometres**, correct to 3 significant figures.

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

(e) In one week, the plane flies a total distance of 8520 km, correct to the nearest ten kilometres.

Write down the lower bound of this distance.

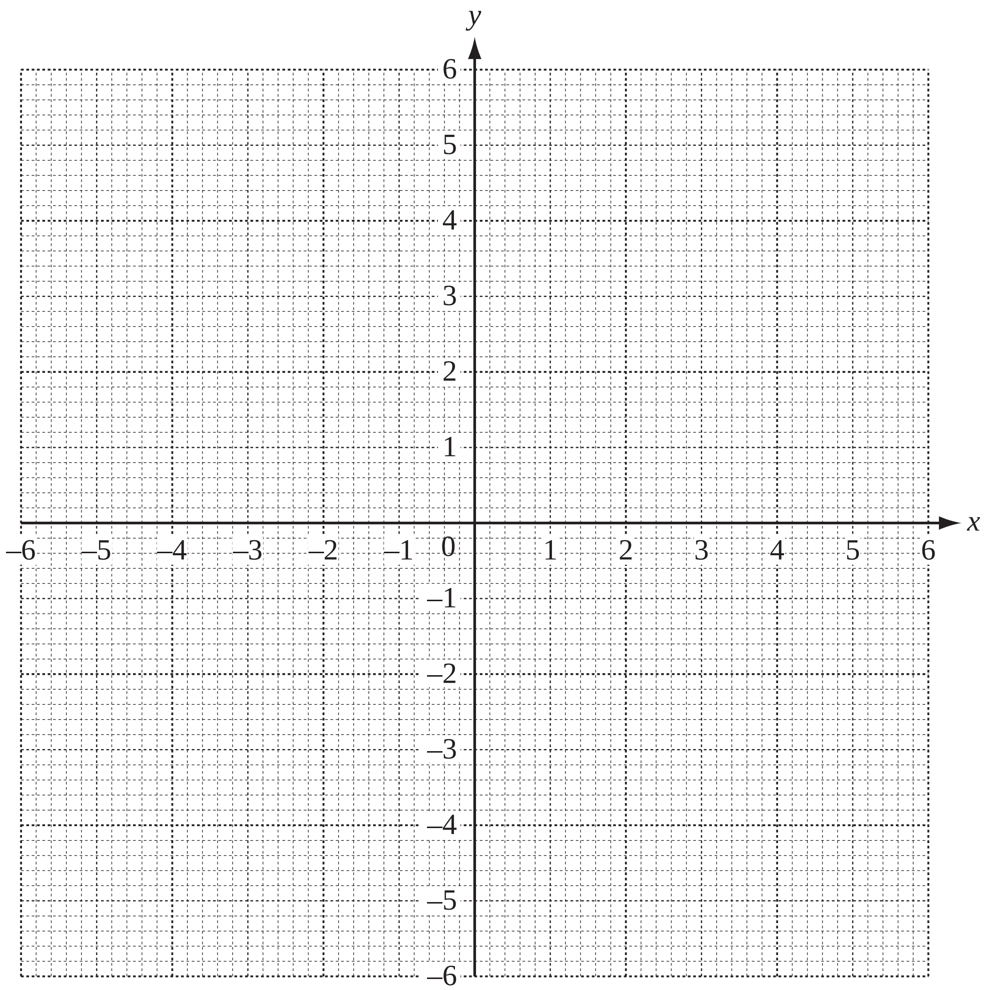
Answer(e) .... km [1]

5 **(a)** Complete the table of values for $y = \frac{5}{x}$.

x	–5	–4	–3	–2	–1		1	2	3	4	5
y			–1.67	–2.5	–5		5		1.67	1.25	

[2]

(b) On the grid, draw the graph of $y = \frac{5}{x}$ for $-5 \leqslant x \leqslant -1$ and $1 \leqslant x \leqslant 5$.



[4]

(c) Use your graph to solve the equation $\frac{5}{x} = 4$.

Answer(c) x = ... [1]

(d) **(i)** On the grid, draw the line $x = -3.5$. [1]

(ii) On the grid, plot the point (5, –3) and label it P. [1]

(iii) Draw the line that passes through P and is perpendicular to $x = -3.5$. [1]

For Examiner's Use

For Examiner's Use

6 **(a)** Here are three different sequences.
Write the missing terms in the spaces provided.

(i) 2, 8, 14, 20, ... [1]

(ii) 1, 4, 9, ... , 25 [1]

(iii) .... , 12, 7, 2, ... [2]

(b) Here is the rule for finding the next term in another sequence.

Double the previous term and subtract 1.

The first two terms in this sequence are 3 and 5.

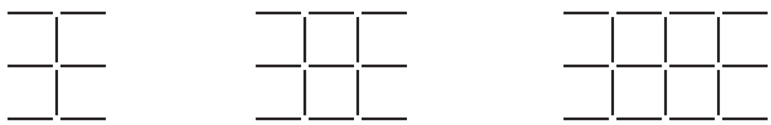
(i) Work out the **next two** terms in the sequence.

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

(ii) Complete the following statement.

All the terms in this sequence are .... numbers. [1]

(c) Here is the start of a sequence of stick patterns.



Pattern 1 8 sticks | Pattern 2 13 sticks | Pattern 3 18 sticks

(i) Find the number of sticks in Pattern 4.

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

(ii) Write down an expression for the number of sticks in Pattern n.

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

(iii) One pattern in the sequence has 98 sticks.

Which pattern number is this?

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

7 12 people each solved the same puzzle.
The table shows their ages and the time they each took to solve the puzzle.

Age (years)	19	24	28	16	25	20	15	22	32	30	68	16
Time (seconds)	36	38	42	36	45	42	32	40	40	46	56	38

(a) Find the median age.

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

(b) For these 12 people, explain why the mean age may not be an appropriate average.

Answer(b) ....

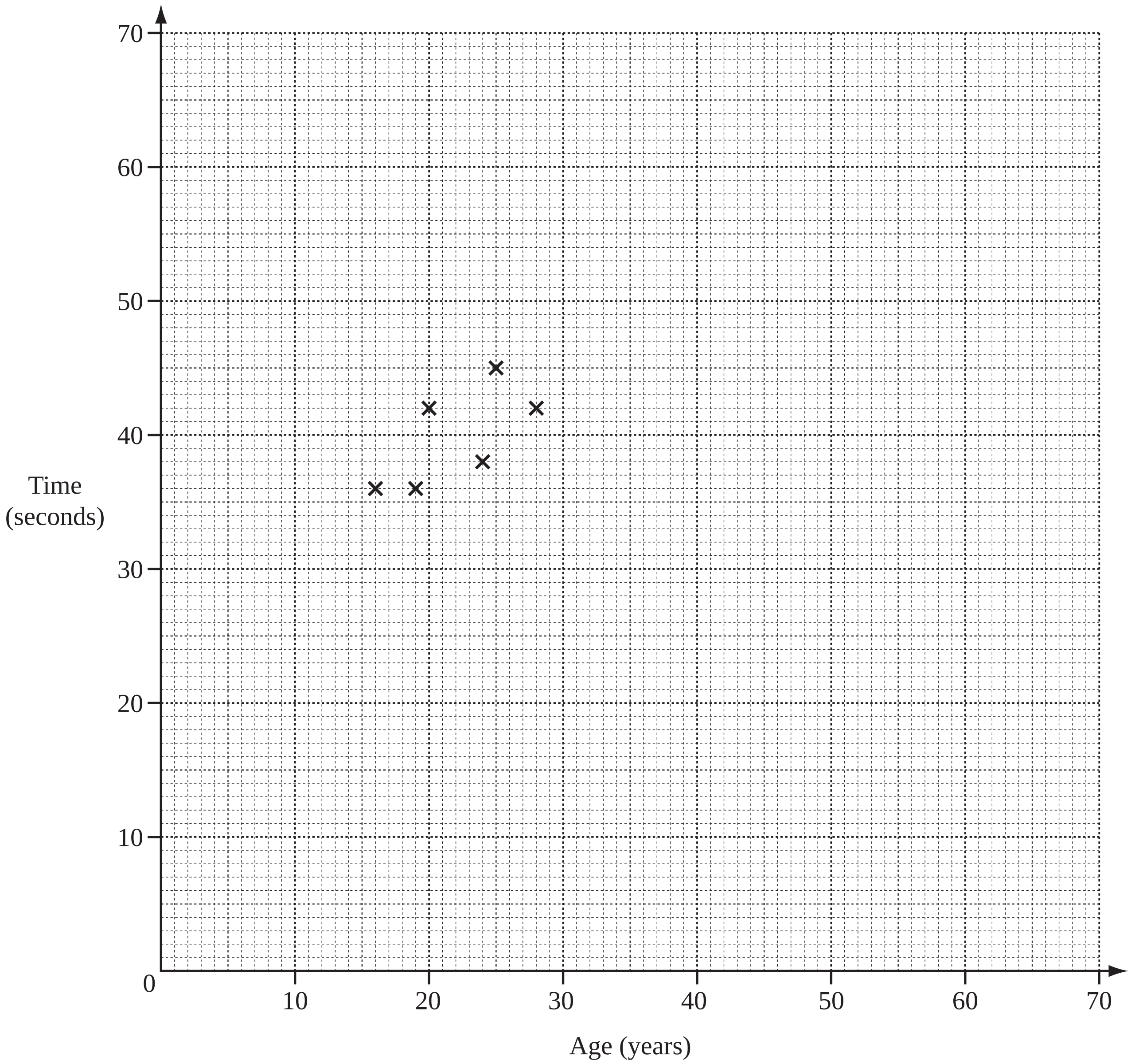
.... [1]

(c) Calculate the mean **time** taken.

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

For Examiner's Use

(d) **(i)** Complete the scatter diagram.
The first six points have been plotted for you.



[2]

(ii) What type of correlation does the scatter diagram show?

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

(iii) Draw a line of best fit on the scatter diagram. [1]

(iv) Would it be sensible to use your line of best fit to estimate the time taken by a child aged 8 to solve the puzzle?
Explain your answer.

Answer(d)(iv) .... because ....

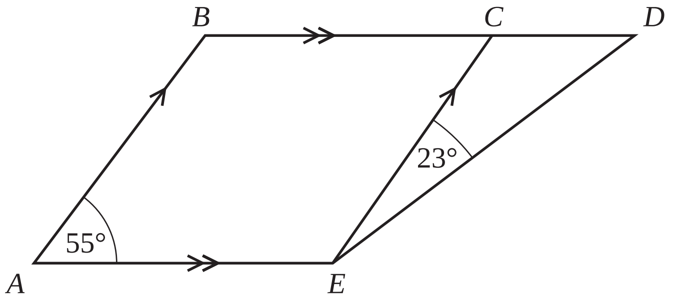
.... [1]

8 **(a)** Complete the table.

Name of polygon	Number of sides
Quadrilateral	4
Heptagon	
	5

[2]

(b)



NOT TO SCALE

In the diagram, *AB* is parallel to *EC* and *BCD* is parallel to *AE*.
Angle *BAE* = 55° and angle *CED* = 23°.

(i) Complete the following statement.

The mathematical name for quadrilateral *ABDE* is .... [1]

(ii) Work out the size of angle *ABC*.

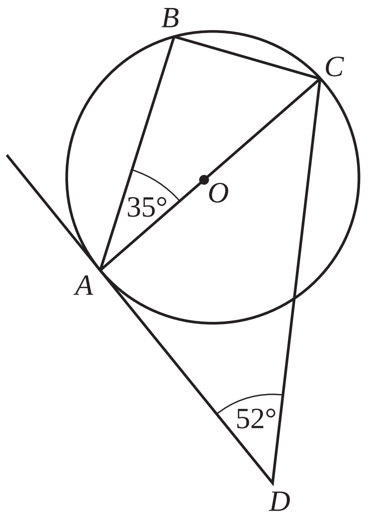
Answer(b)(ii) Angle *ABC* = ... [1]

(iii) Work out the size of angle *CDE*.

Answer(b)(iii) Angle *CDE* = ... [2]

For Examiner's Use

(c)



Points *A*, *B* and *C* lie on a circle with centre *O*.
DA is a tangent to the circle at *A*.
Angle *BAC* = 35° and angle *ADC* = 52°.

(i) Write down the size of angle *ABC* giving a reason for your answer.

Answer(c)(i) Angle *ABC* = ... because ....

.... [2]

(ii) Work out the size of angle *BCA*.

Answer(c)(ii) Angle *BCA* = ... [1]

(iii) Work out the size of angle *BCD*.

Answer(c)(iii) Angle *BCD* = ... [3]

For Examiner's Use

9 **(a)** The table shows some information about minimum and maximum temperatures in Moscow one January and February.

Temperature	January	February
Maximum	–9°C	2°C
Minimum	–16°C	

(i) Find the difference between the maximum and minimum temperatures in January.

Answer(a)(i) ....°C [1]

(ii) The difference between the maximum and minimum temperatures in February was 34°C.

Find the minimum temperature in February.

Answer(a)(ii) ....°C [1]

(iii) The minimum temperature in Moscow in December was 5°C higher than the minimum temperature in January.

Work out the minimum temperature in December.

Answer(a)(iii) ....°C [1]

For Examiner's Use

(b) The table shows the population of some cities in Russia.

City	Population
Kaliningrad	4.30×10^5
Moscow	
Novosibirsk	1.40×10^6
Omsk	1.13×10^6
Saint Petersburg	4.58×10^6

(i) The population of Moscow is 10 500 000.

Complete the table by writing the population of Moscow in standard form. [1]

(ii) Write the population of Saint Petersburg as an ordinary number.

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

(iii) Which city has the smallest population?

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

(iv) Find the difference between the population of Novosibirsk and the population of Omsk.
Give your answer in standard form.

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

Question 10 is printed on the next page.

For Examiner's Use

10 **(a)** Solve the equation.

$$6(x - 2) = 9$$

Answer(a) x = ... [2]

(b) Expand and simplify.

$$8(n - 1) - 2(3n + 5)$$

Answer(b) .... [2]

(c) Factorise completely.

$$10p^2 + 5p^3$$

Answer(c) .... [2]