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0580/32

October/November 2013

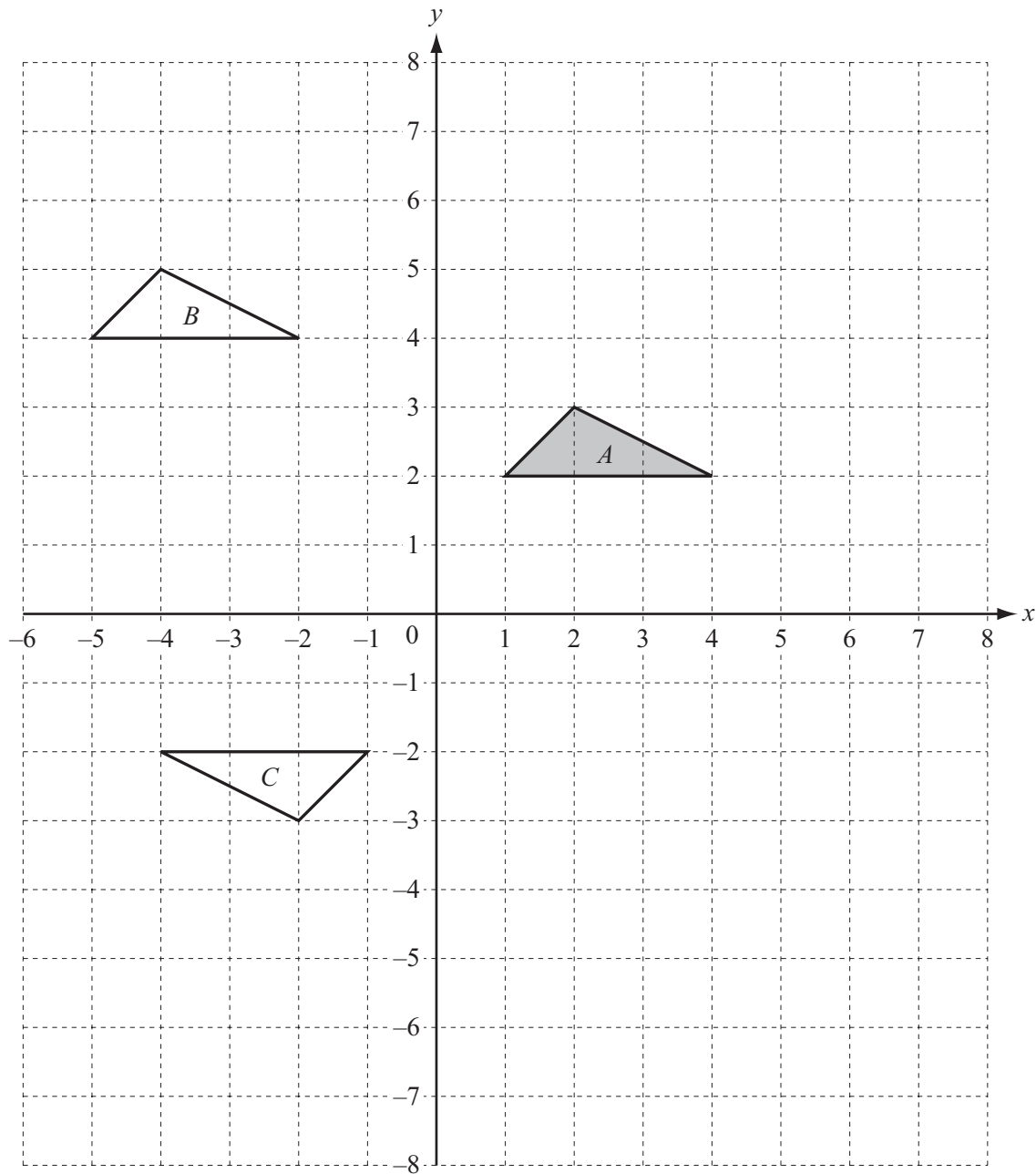
2 hours

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

The total of the marks for this paper is 104.

[Turn over

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]

(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]

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]

- 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]

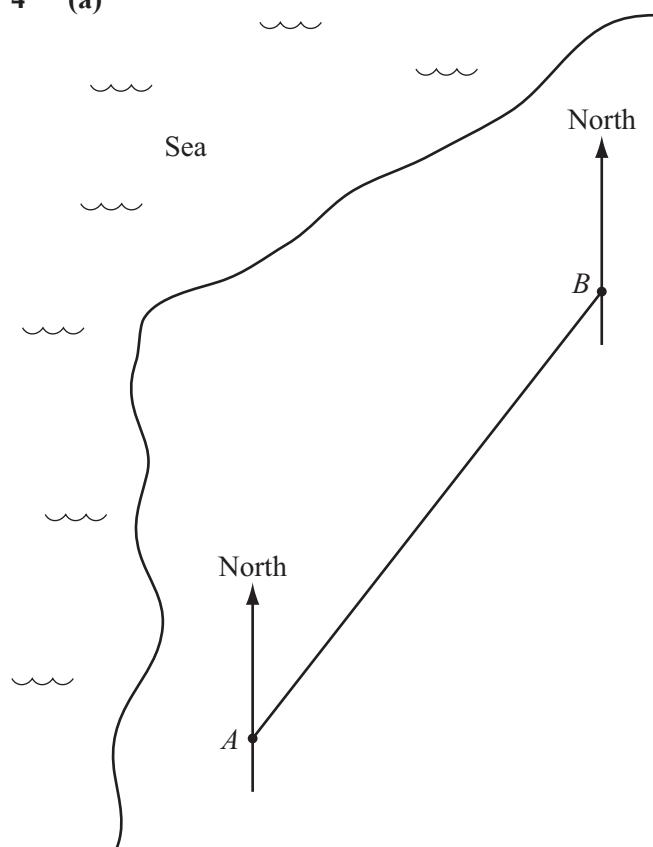
- (iii) Write down the probability that Simon's sweet is green.

Answer(b)(iii) [1]

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

Answer (b)(iv) [1]

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]

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- (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.

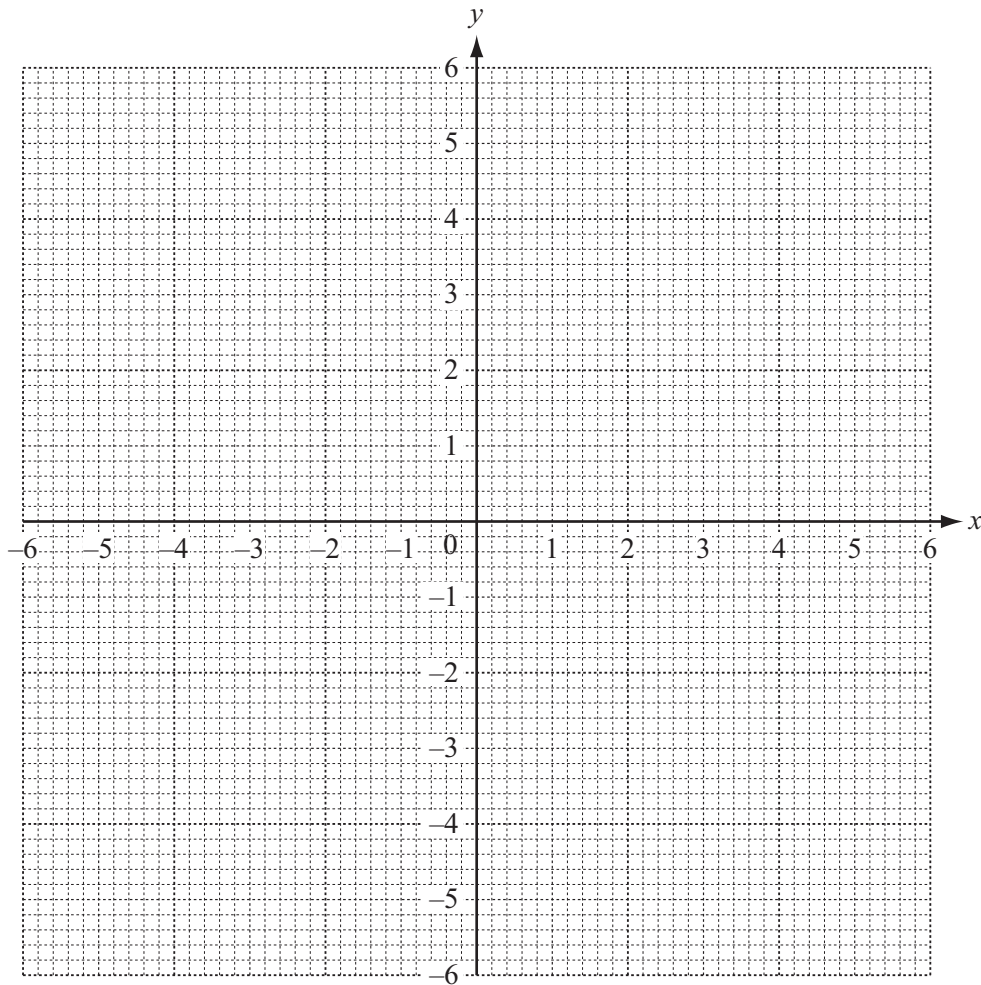
Answer(e) km [1]

- 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 $-5 \leq x \leq -1$ and $1 \leq x \leq 5$.



[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]

- 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.

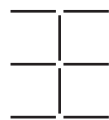
- (i) Work out the **next two** terms in the sequence.

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.

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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]

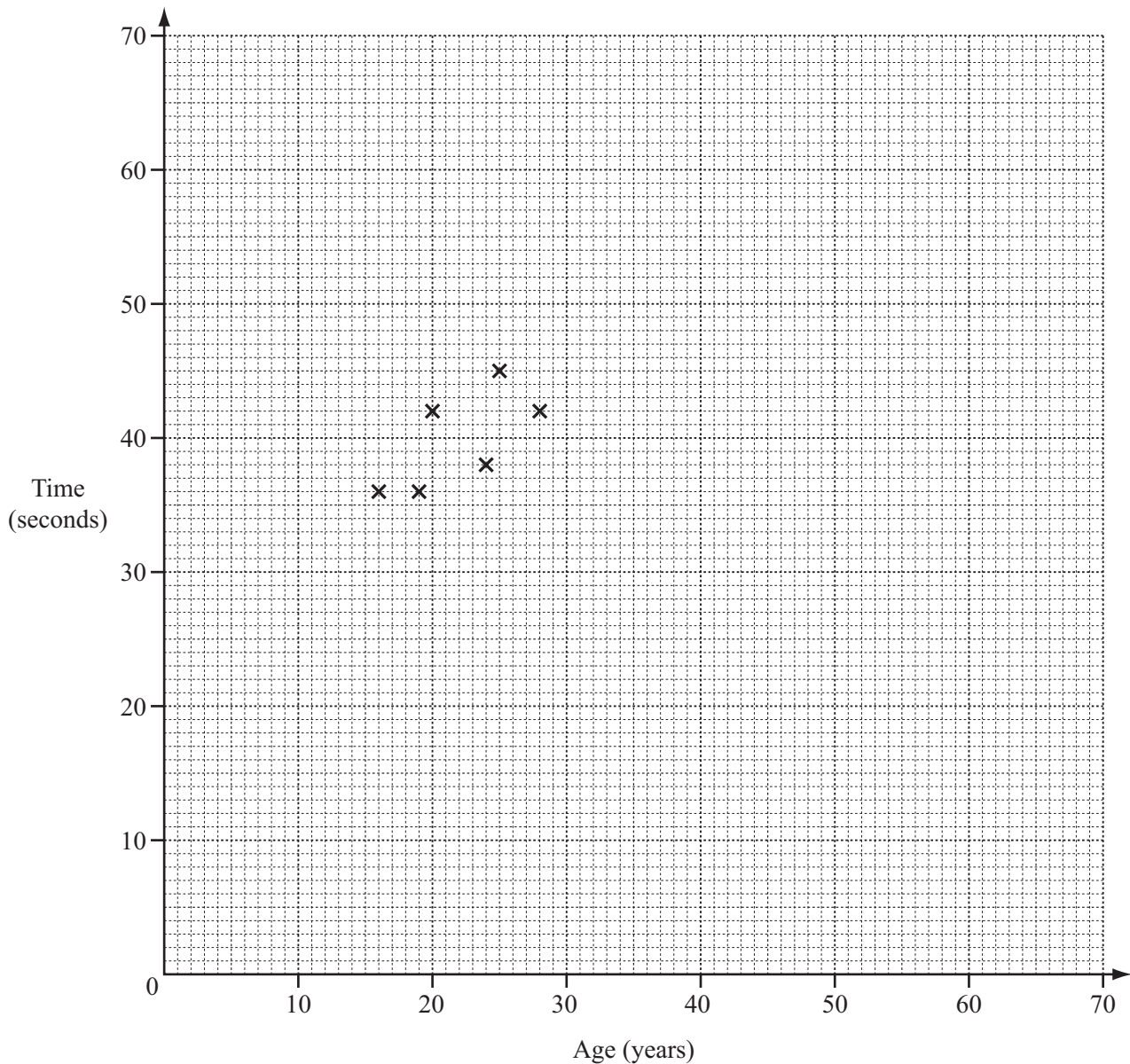
- (b) For these 12 people, explain why the mean age may not be an appropriate average.

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

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

Answer(c) seconds [2]

- (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

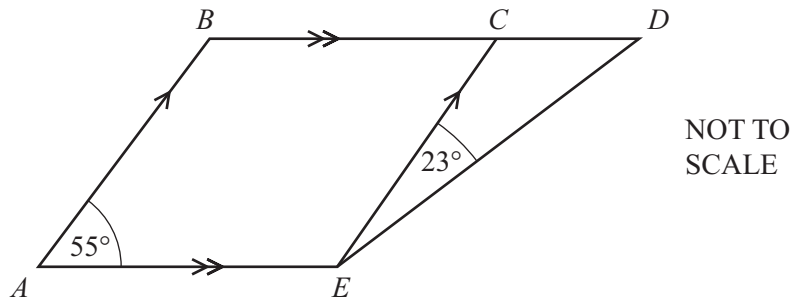
..... [1]

- 8 (a) Complete the table.

Name of polygon	Number of sides
Quadrilateral	4
Heptagon	
	5

[2]

- (b)



In the diagram, AB is parallel to EC and BCD is parallel to AE .
Angle $BAE = 55^\circ$ and angle $CED = 23^\circ$.

- (i) Complete the following statement.

The mathematical name for quadrilateral $ABDE$ is [1]

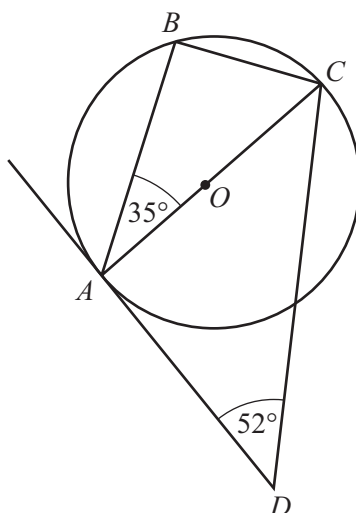
- (ii) Work out the size of angle ABC .

Answer(b)(ii) Angle $ABC =$ [1]

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

Answer(b)(iii) Angle $CDE =$ [2]

(c)

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Points A , B and C lie on a circle with centre O .

DA is a tangent to the circle at A .

Angle $BAC = 35^\circ$ and angle $ADC = 52^\circ$.

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

Answer(c)(i) Angle $ABC = \dots\dots\dots$ because $\dots\dots\dots$

$\dots\dots\dots$ [2]

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

Answer(c)(ii) Angle $BCA = \dots\dots\dots$ [1]

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

Answer(c)(iii) Angle $BCD = \dots\dots\dots$ [3]

- 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) $^{\circ}\text{C}$ [1]

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

Find the minimum temperature in February.

Answer(a)(ii) $^{\circ}\text{C}$ [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) $^{\circ}\text{C}$ [1]

- (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.

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]

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