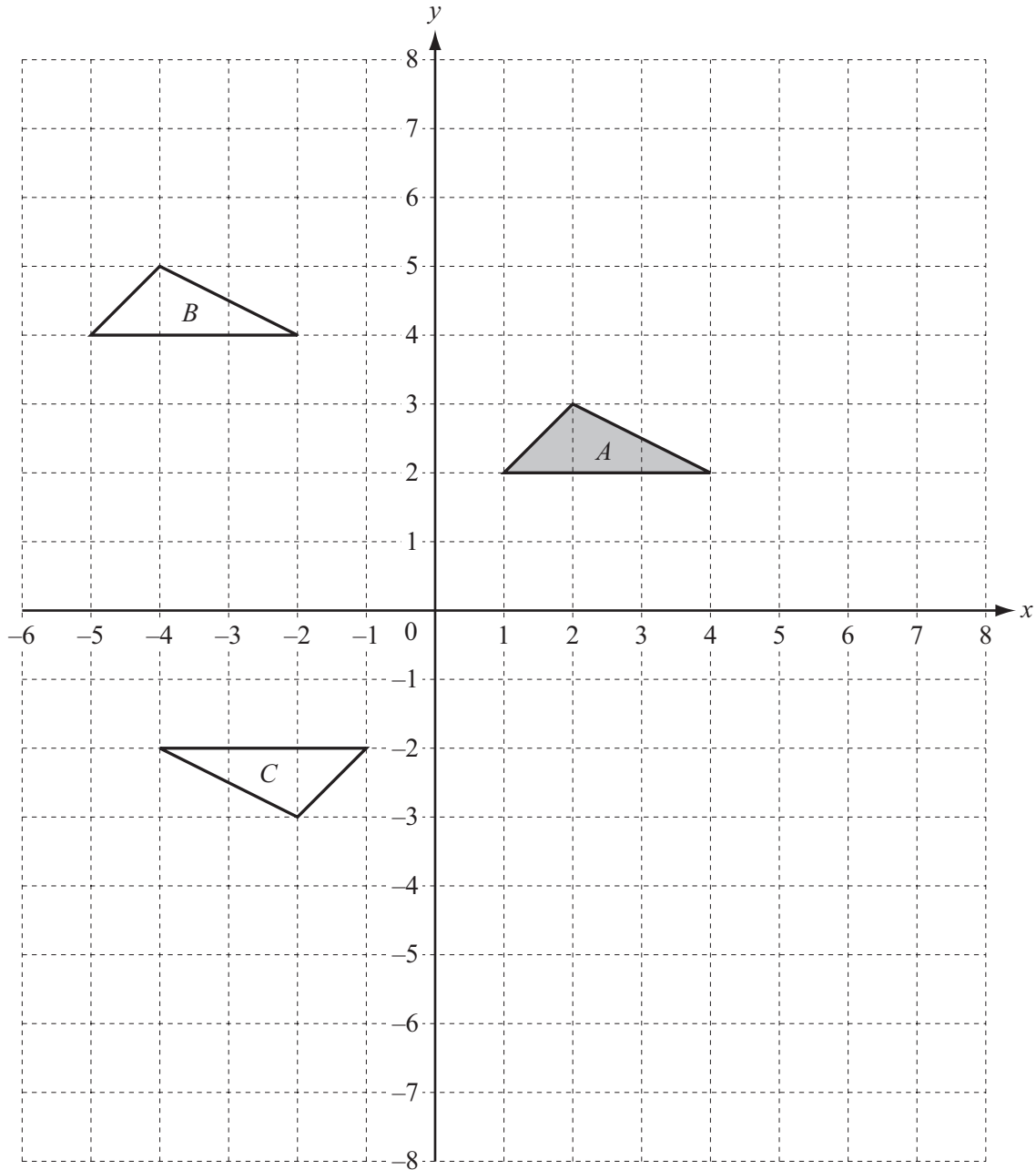




1



Triangles *A*, *B* and *C* are shown on a 1 cm<sup>2</sup> 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<sup>2</sup> [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]

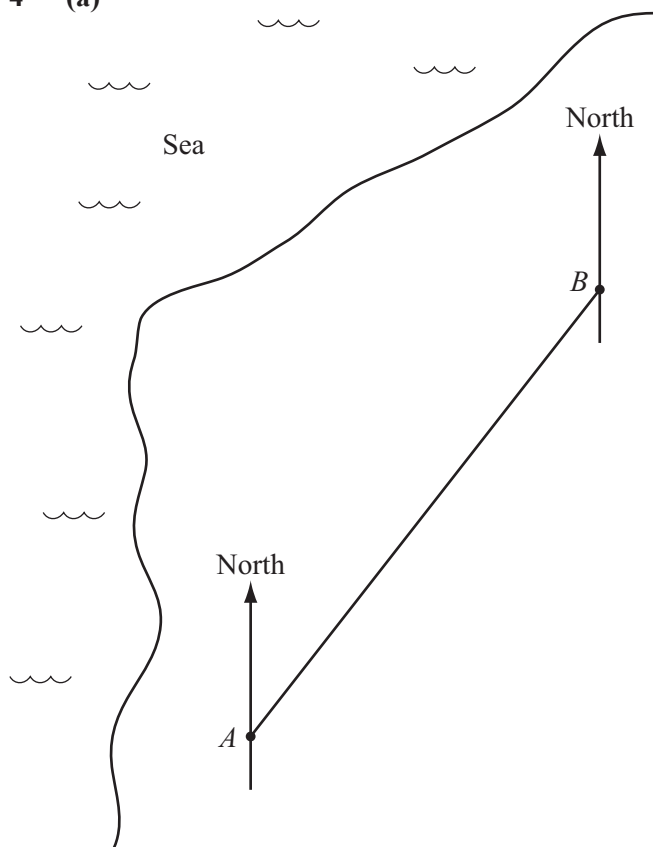
- (iii) Write down the probability that Simon's sweet is green.

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]

- (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]

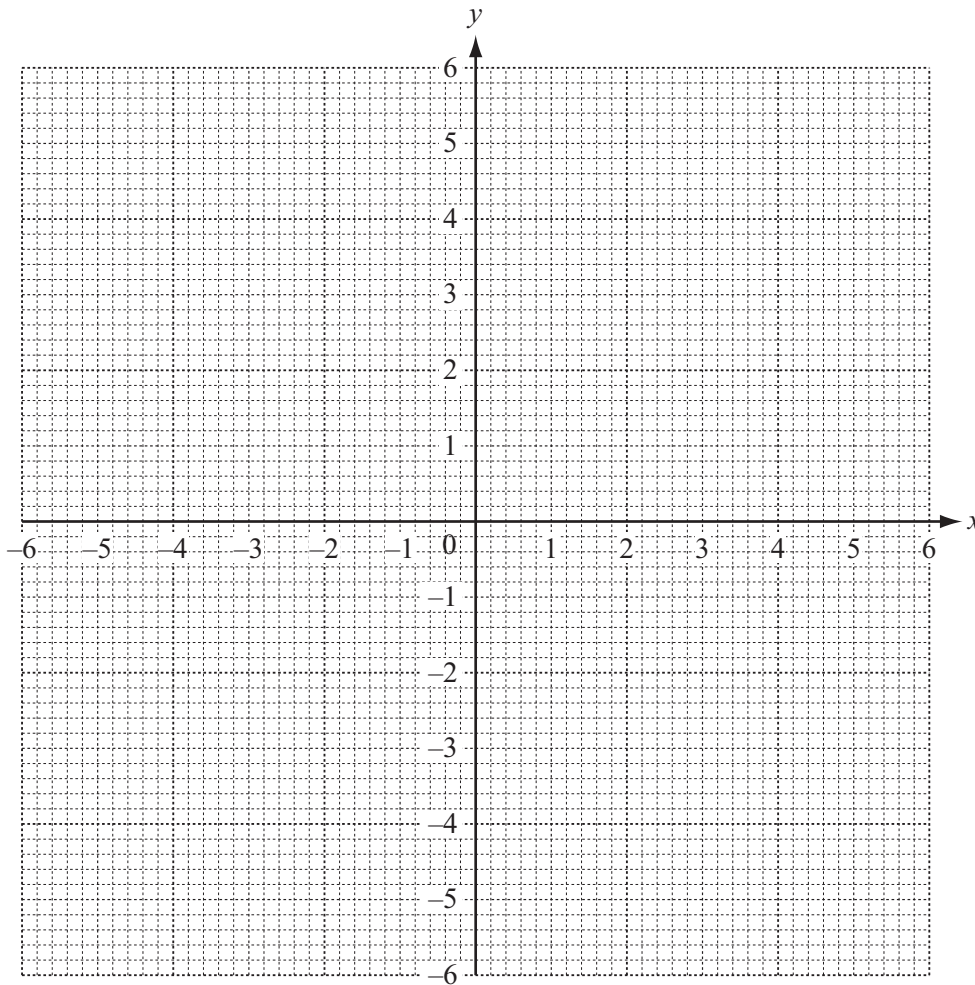
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- 5 (a) Complete the table of values for  $y = \frac{5}{x}$ .

|     |    |    |       |      |    |  |   |   |      |      |   |
|-----|----|----|-------|------|----|--|---|---|------|------|---|
| $x$ | -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.

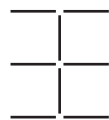
(i) Work out the **next two** terms in the sequence.

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.

|                |    |    |    |    |    |    |    |    |    |    |    |    |
|----------------|----|----|----|----|----|----|----|----|----|----|----|----|
| 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]

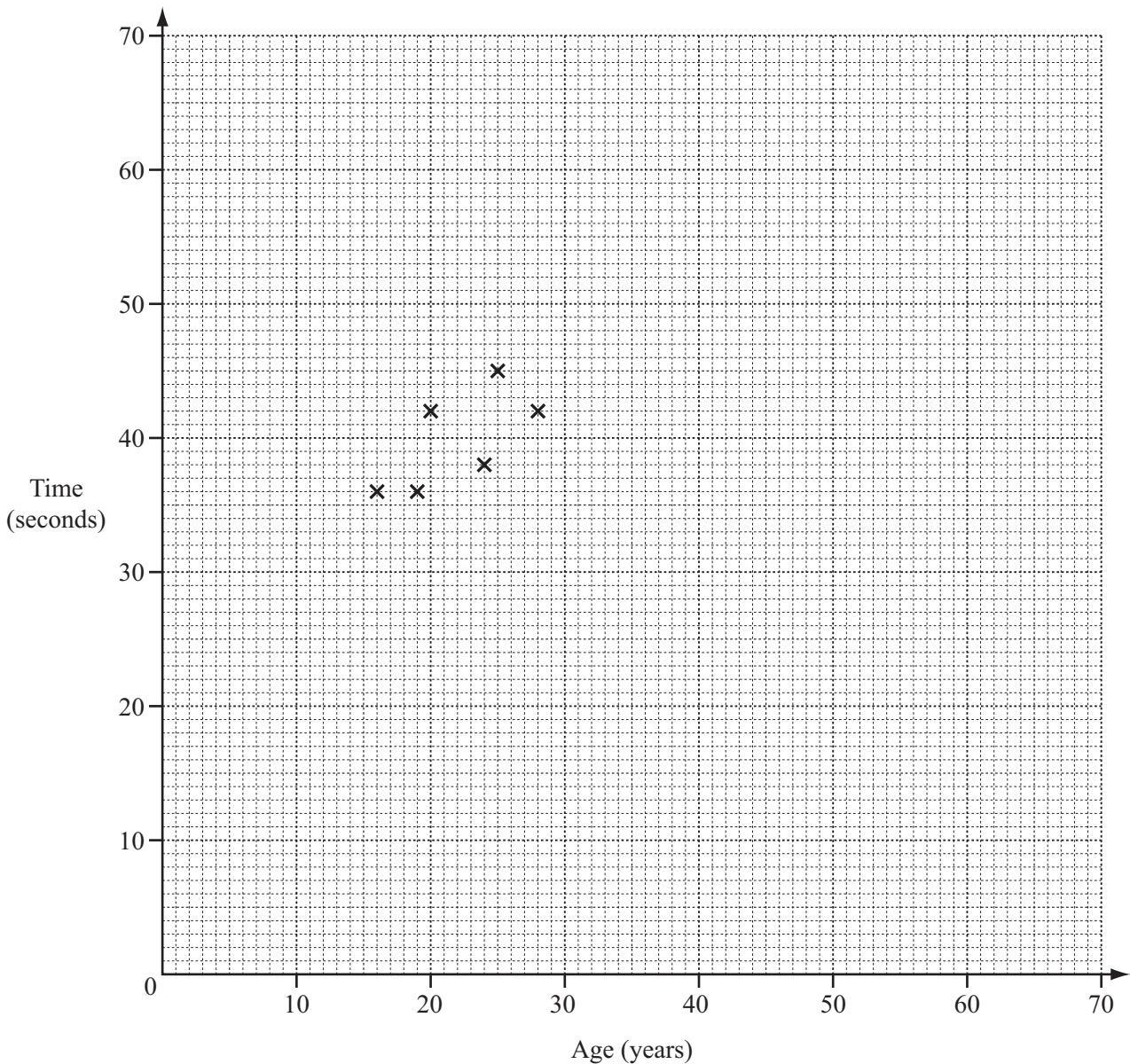
- (b) For these 12 people, explain why the mean age may not be an appropriate average.

*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 .....

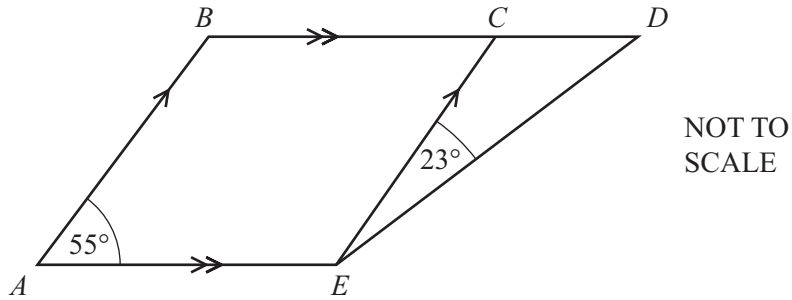
..... [1]

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]

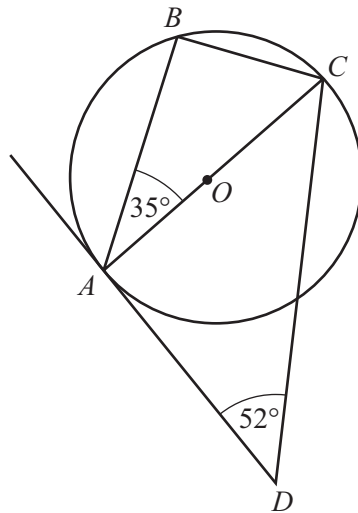
(ii) Work out the size of angle  $ABC$ .

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

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

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

(c)

NOT TO  
SCALE

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     | $-9^{\circ}\text{C}$  | $2^{\circ}\text{C}$ |
| Minimum     | $-16^{\circ}\text{C}$ |                     |

- (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  $34^{\circ}\text{C}$ .

Find the minimum temperature in February.

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

- (iii) The minimum temperature in Moscow in December was  $5^{\circ}\text{C}$  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      | $4.30 \times 10^5$ |
| Moscow           |                    |
| Novosibirsk      | $1.40 \times 10^6$ |
| Omsk             | $1.13 \times 10^6$ |
| Saint Petersburg | $4.58 \times 10^6$ |

- (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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