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0580/33

May/June 2017

2 hours

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

READ THESE INSTRUCTIONS FIRST

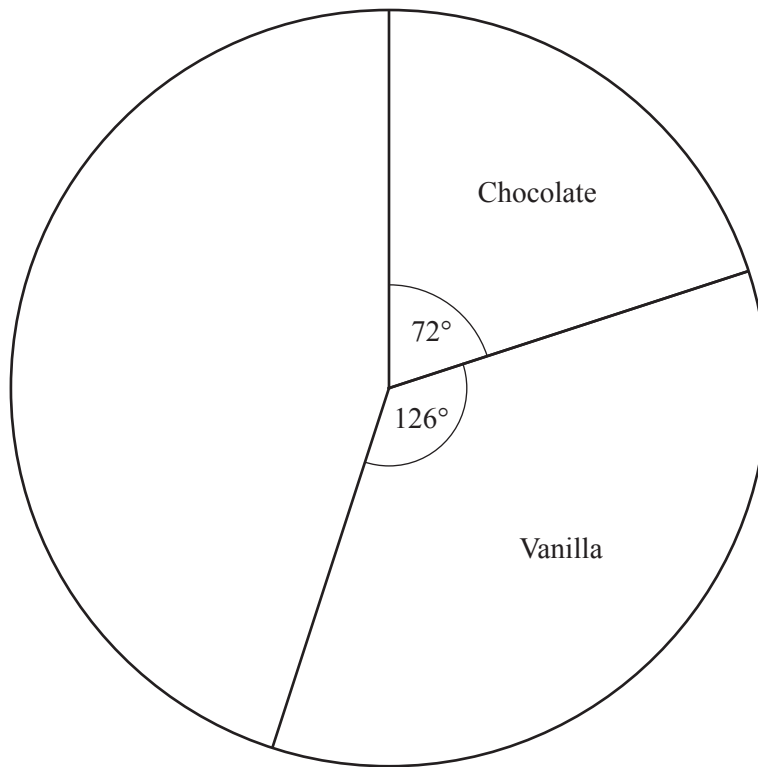
DO **NOT** WRITE IN ANY BARCODES.

For π , use either your calculator value or 3.142.

The total of the marks for this paper is 104.

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

- 1 Some children chose their favourite ice-cream flavour from chocolate, vanilla, strawberry and banana. Some of the results are shown in the pie chart below.



- (a) 8 children chose chocolate.

Work out the total number of children.

..... [2]

- (b) Work out how many children chose vanilla.

..... [2]

- (c) The rest of the children chose strawberry or banana.
Twice as many children chose strawberry as chose banana.

Use this information to complete the pie chart.

[2]

- (d) Write down the flavour of ice-cream that is the mode.

..... [1]

- 2 (a) The diameter of the Earth is 12 756 km.

Write 12 756 km in metres.

..... m [1]

- (b) The distance from the Earth to the Moon is 384 000 km.

Work out the time it would take a car travelling at 100 km/h to travel 384 000 km.
Give your answer in days.

..... days [2]

- (c) The distance from the Sun to the Earth is 149.6 million kilometres.

Write 149.6 million in standard form.

..... [2]

- (d) The diameter of a grain of salt is 1×10^{-4} metres.

- (i) Write 1×10^{-4} as an ordinary number.

..... [1]

- (ii) Write 1×10^{-4} metres in millimetres.

..... mm [1]

3 The McVay family go to the cinema.

(a) The cinema has 510 seats.

- (i) The first 6 rows each have 18 seats.
The next 8 rows each have 20 seats.
All the other rows each have 22 seats.

Work out the total number of **rows** of seats in the cinema.

..... [3]

- (ii) 70% of the 510 seats are occupied.

Work out how many seats are occupied.

..... [1]

(b) The McVay family has 2 adults and 2 children.

Ticket Prices	
Adult	\$7.95
Child	\$5.95
Family Ticket (2 Adults and 2 Children) \$24	

Work out how much they save by buying a family ticket rather than a ticket for each person.

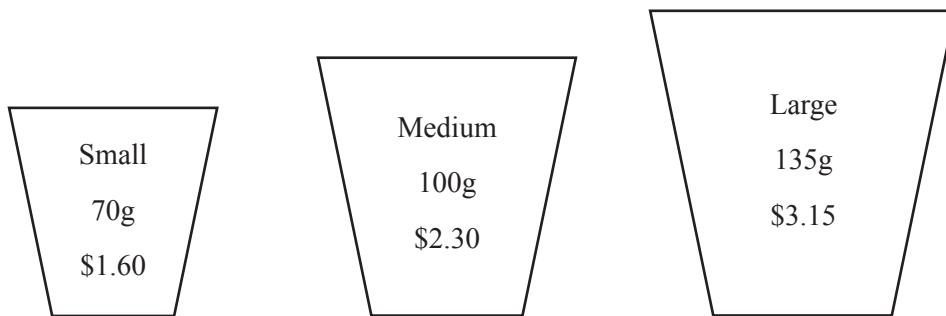
\$..... [2]

- (c) The film starts at 14 15 and lasts for 116 minutes.

Work out the time that the film ends.

..... [2]

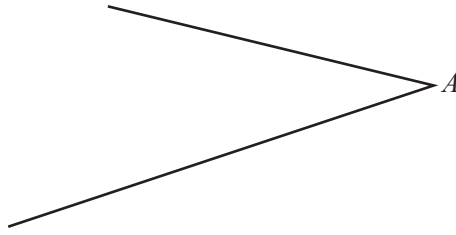
- (d) Popcorn is sold in tubs.



Work out which tub of popcorn is the best value for money.
You must show your working.

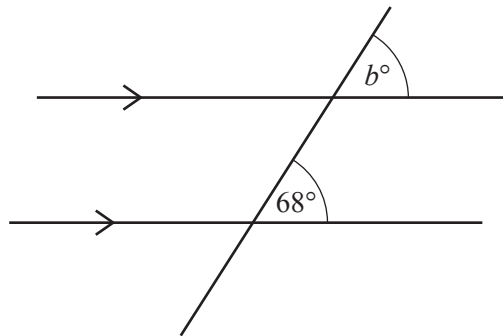
..... [3]

- 4 (a) Measure the reflex angle at A .



..... [1]

- (b)

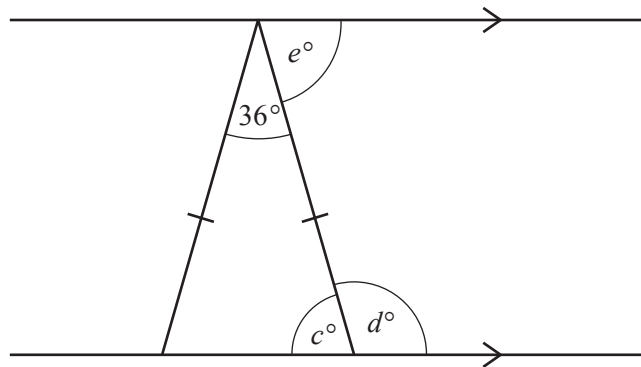


NOT TO
SCALE

Find the value of b .
Give a reason for your answer.

$b =$ because [2]

- (c)



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Find the values of c , d and e .

$c =$

$d =$

$e =$ [3]

- (d) A regular polygon has 24 sides.

Work out the size of one of the interior angles of the polygon.

..... [3]

- (e) Town Y is 6.7 km from town X .
The bearing of town Y from town X is 113° .

On the scale drawing, draw a line from X and mark the position of Y .
The scale is 1 centimetre represents 1 kilometre.



Scale: 1 cm to 1 km

[2]

- (f) Give the correct mathematical name for each of the shapes described below.

- (i) I am a quadrilateral.
I have two pairs of parallel sides but no right angles.
I have two lines of symmetry.

..... [1]

- (ii) I am a quadrilateral.
I have one pair of opposite angles that are equal.
I have one line of symmetry.

..... [1]

5 Simone makes a fruit cake.

- (a) (i) The recipe needs 175 g sugar, 200 g butter and 225 g flour.

Write the ratio sugar : butter : flour in its simplest form.

..... : : [2]

- (ii) The recipe needs a total of 600 g of fruit.
The ratio sultanas : currants : raisins = 4 : 3 : 1.

Work out the mass of each type of fruit.

Sultanas = g

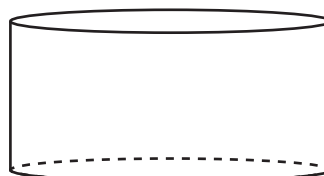
Currants = g

Raisins = g [3]

- (b) The cake can be made in either a cylindrical tin or a square-based tin.

- (i) The cylindrical tin has radius 10 cm.
In this tin the cake is 5 cm high.

Show that the volume of the cake is 1600 cm^3 ,
correct to 2 significant figures.

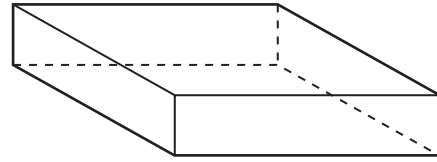


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[2]

- (ii) In the square-based tin, the cake is 4 cm high.
The volume of the cake is 1600 cm^3 .

Work out the length of a side of the base of this tin.



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..... cm [2]

- (c) The mass, m grams, of the cake is 1340 g, correct to the nearest 20 g.

Complete the statement about the value of m .

..... $\leq m <$ [2]

- (d) The number of kilocalories (kcal) in **one quarter** of the cake is 1290 kcal.
The **whole cake** is cut into 12 equal pieces.

- (i) Calculate the number of kilocalories in one piece of cake.

..... kcal [2]

- (ii) The daily recommended number of kilocalories for Simone is 2000 kcal.

Work out the number of kilocalories in one piece of cake as a percentage of 2000 kcal.

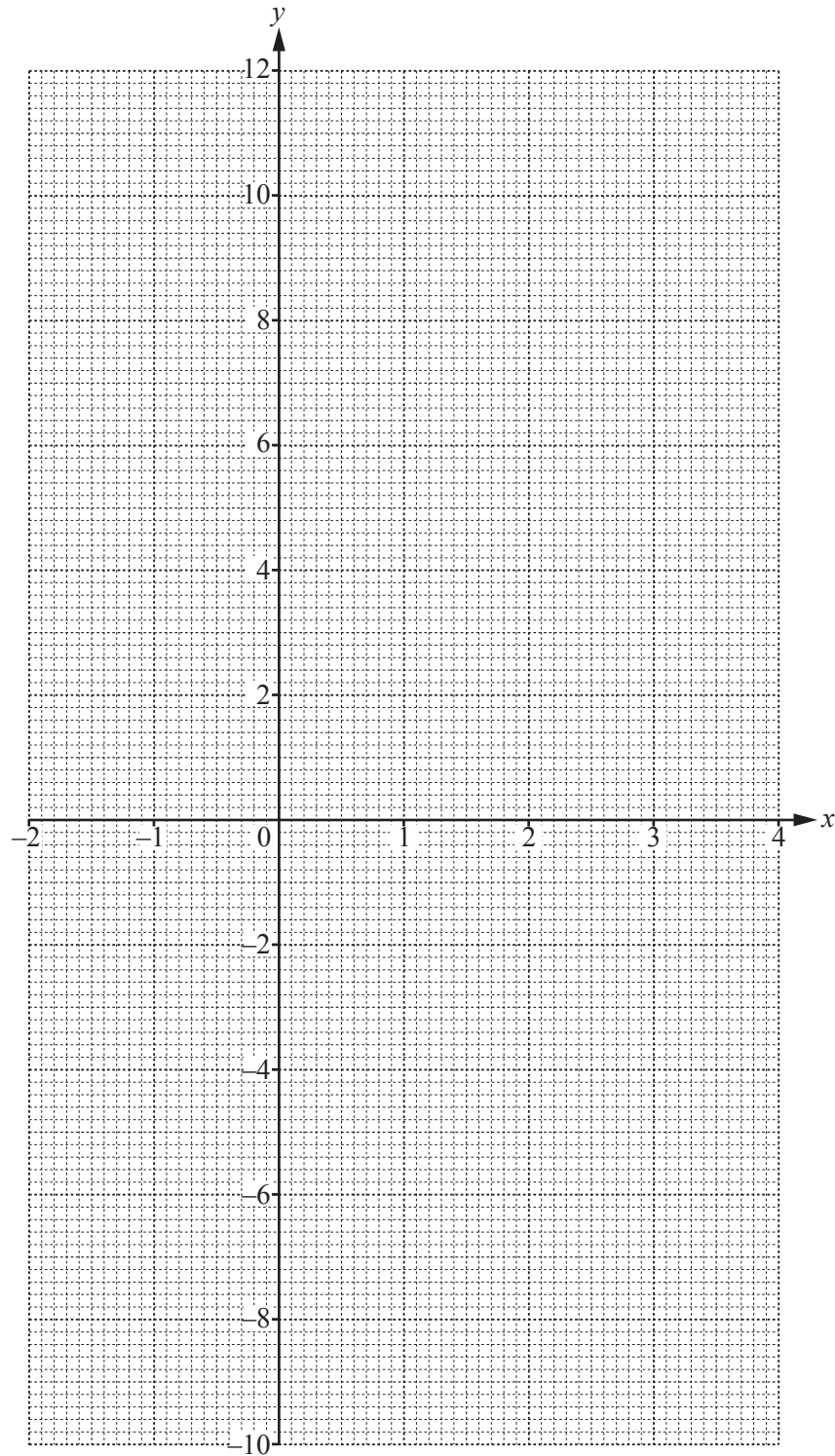
..... % [1]

- 6 (a) (i) Complete the table of values for $y = 2x^2 - 4x - 6$.

x	-2	-1	0	1	2	3	4
y			-6		-6	0	

[2]

- (ii) On the grid, draw the graph of $y = 2x^2 - 4x - 6$ for $-2 \leq x \leq 4$.



[4]

(b) (i) On the grid, draw the line $y = 5$. [1]

(ii) Use your graph to solve the equation $2x^2 - 4x - 6 = 5$.

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ [2]

(c) Explain why the equation $2x^2 - 4x - 6 = -9$ has no solutions.

.....

..... [1]

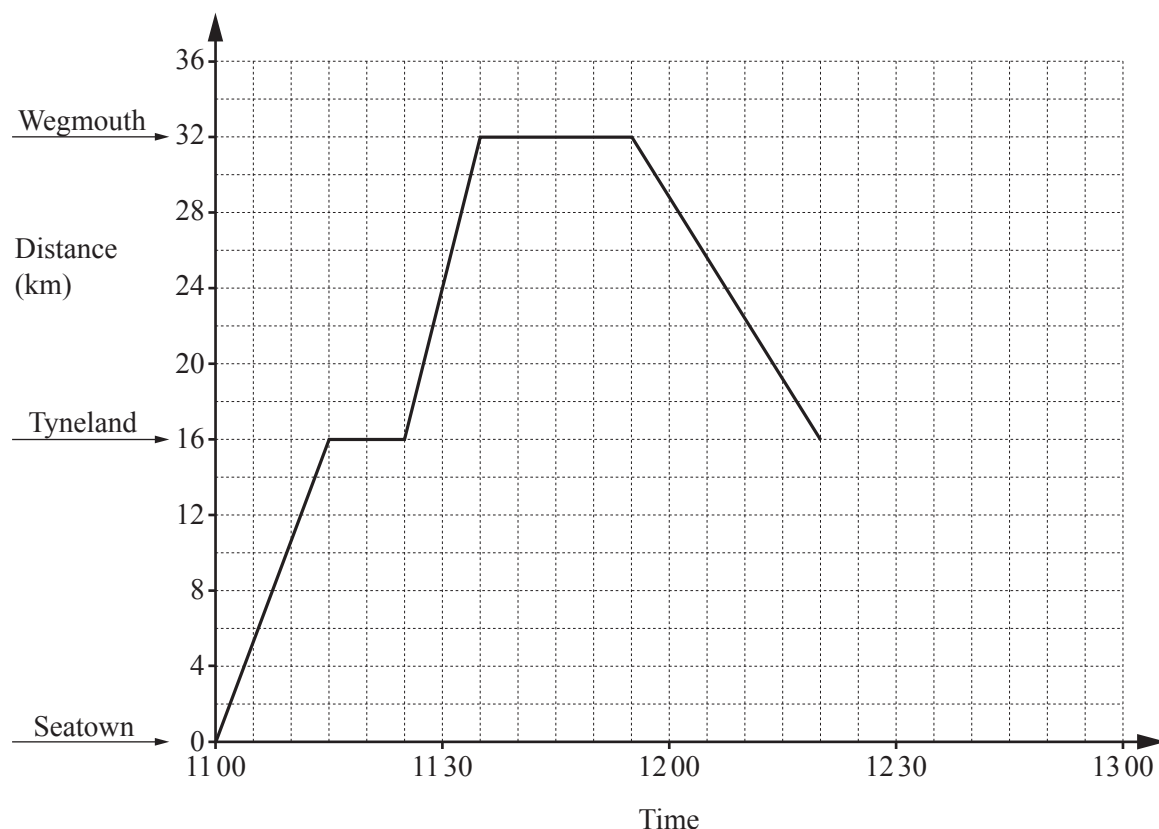
(d) (i) Write down the equation of the line of symmetry of $y = 2x^2 - 4x - 6$.

..... [1]

(ii) Use the symmetry of the graph to complete this statement.

When $2x^2 - 4x - 6 = 64$, there are two solutions for x , $x = 7$ or $x = \dots\dots\dots$ [1]

7



The diagram shows the travel graph for a bus travelling between three towns.

- (a) (i) For how many minutes does the bus stop at Wegmouth?

..... minutes [1]

- (ii) Write down the time the bus leaves Wegmouth.

..... [1]

- (iii) The speed of the bus from Tyneland to Wegmouth is 96 km/h.

Change 96 km/h to metres per second.

..... m/s [2]

- (b) On the journey back from Wegmouth, the bus stops for 15 minutes in Tyneland.
It then travels at a constant speed of 64 km/h to Seatown.

Complete the travel graph.

[3]

- (c) A cyclist leaves Seatown at 11 15 and travels at a constant speed to Wegmouth. She arrives in Wegmouth at 12 30.

(i) On the travel graph, draw this journey. [1]

(ii) Write down the time when the cyclist meets the bus.

..... [1]

(iii) How far is the cyclist from Wegmouth when she meets the bus?

..... km [1]

- (d) Mrs Jones travels on the bus to Wegmouth.
The probability that she stands on the bus is 0.4 .

(i) Write down the probability that she does not stand on the bus.

..... [1]

(ii) Mrs Jones travels on the bus 85 times.

Work out the expected number of times that she stands on the bus.

..... [1]

- (e) In one week, a bus driver works five days.
On four days he works from 9 am to 5 pm.
On one day he works from 3 pm to 10 pm.

(i) Find the total number of hours he works in this week.

..... hours [2]

(ii) Each day he is paid \$18 per hour before 7 pm.
After 7 pm he is paid 25% extra per hour.

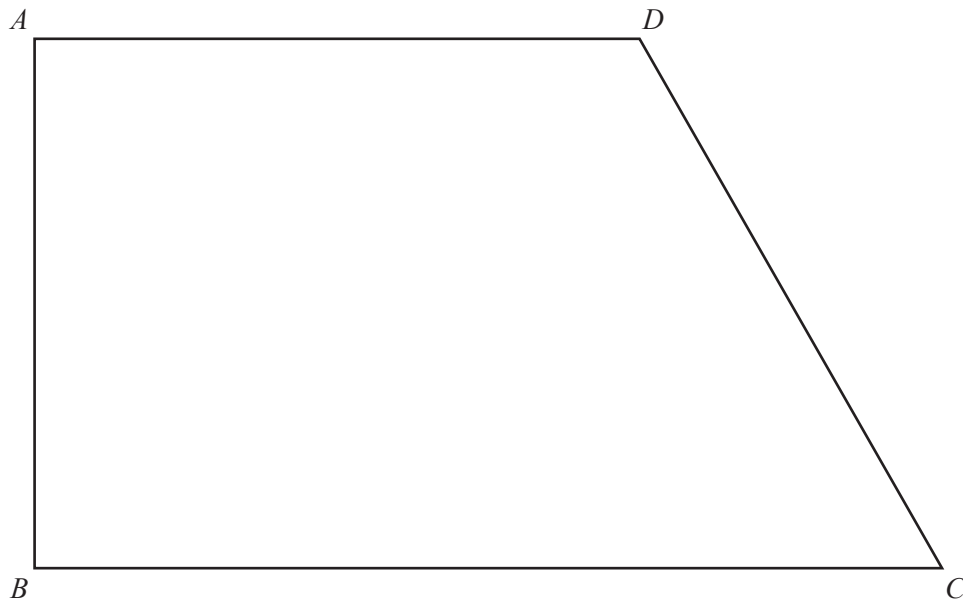
Calculate how much the bus driver is paid for this week.

\$ [3]

- 8 The quadrilateral $ABCD$ is a scale drawing of a farmer's field.

Side AD and side BC are parallel.

Angle DAB and angle ABC are right angles.



- (a) Write down the mathematical name of the quadrilateral.

..... [1]

- (b) The side of the field, AB , is 28 m.

- (i) Complete this statement.

The scale of the diagram is 1 centimetre represents metres.

[2]

- (ii) Work out the actual area of the field in m^2 .

..... m^2 [3]

- (c) The field has two fences.
Each fence extends across the field until it meets another side.

- Fence 1 is the perpendicular bisector of CD .
- Fence 2 is the bisector of angle ABC .

Using a straight edge and compasses only, construct the two fences on the diagram.
Show all your construction arcs.

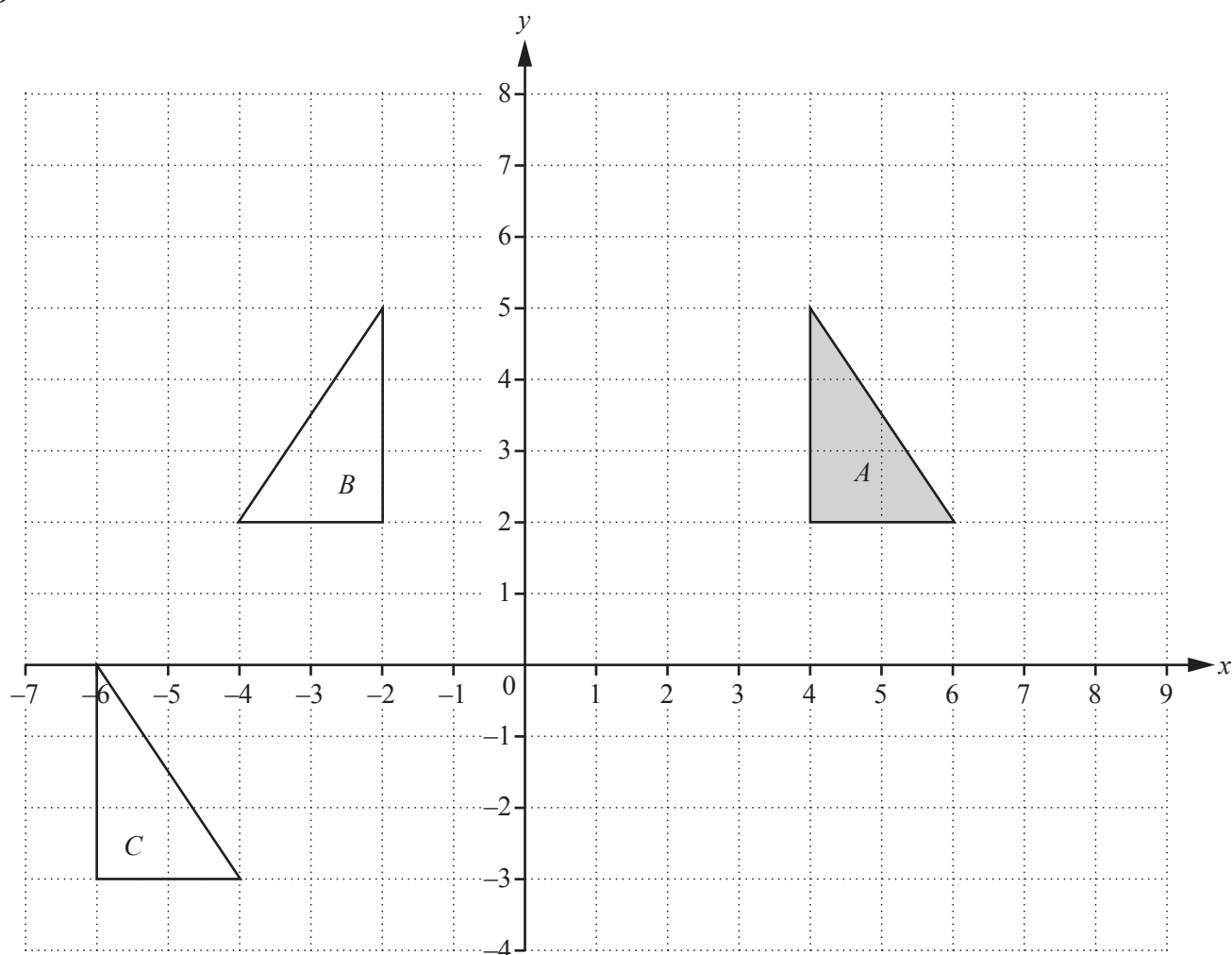
[4]

- (d) The region of the field that is 16 m or less from A is planted with wheat.

- (i) **Using a ruler and compasses only**, construct and shade the region planted with wheat. [3]
- (ii) Work out the actual area of the region that is planted with wheat.

..... m^2 [2]

Question 9 is printed on the next page.



- (a) (i) Describe fully the **single** transformation that maps triangle *A* onto triangle *B*.

.....
 [2]

- (ii) Describe fully the **single** transformation that maps triangle *A* onto triangle *C*.

.....
 [2]

- (b) On the grid, draw the image of

- (i) triangle *A* after a rotation of 270° clockwise about (4, 5), [2]
 (ii) triangle *A* after an enlargement with scale factor 2, centre (4, 7). [2]

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