

1. Solve the following equation.

$$9x - 1 = 4(x + 5)$$

[3]

2. ESTIMATE the value of $\frac{28 \cdot 17 \times 0.48}{\sqrt{94 \cdot 8}}$, giving your answer as a decimal.

Show clearly how you obtain your answer.

[3]

3. The table shows some of the values of $y = 2x^2 - 5x - 8$ for values of x from -2 to 4 .

(a) Complete the table by finding the value of y for $x = 3$.

x	-2	-1	0	1	2	3	4
$y = 2x^2 - 5x - 8$	10	-1	-8	-11	-10		4

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[1]

(b) On the graph paper opposite, draw the graph of $y = 2x^2 - 5x - 8$ for values of x between -2 and 4 .
[2]

(c) Draw the line $y = 3$ on your graph paper and write down the x -values of the points of intersection of your line with $y = 2x^2 - 5x - 8$.

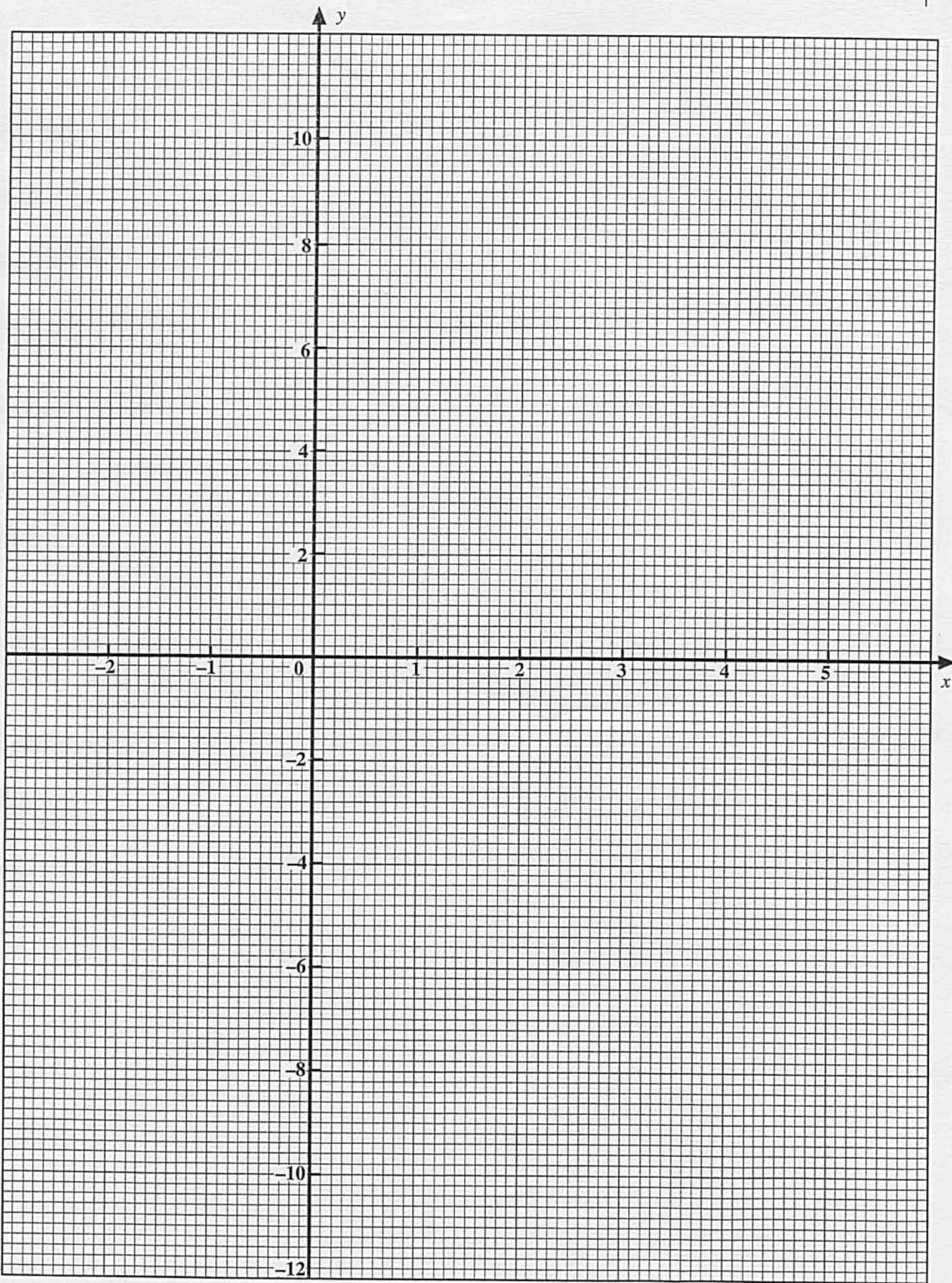
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[2]

(d) Write down and simplify the equation in x whose solutions you found in (c).

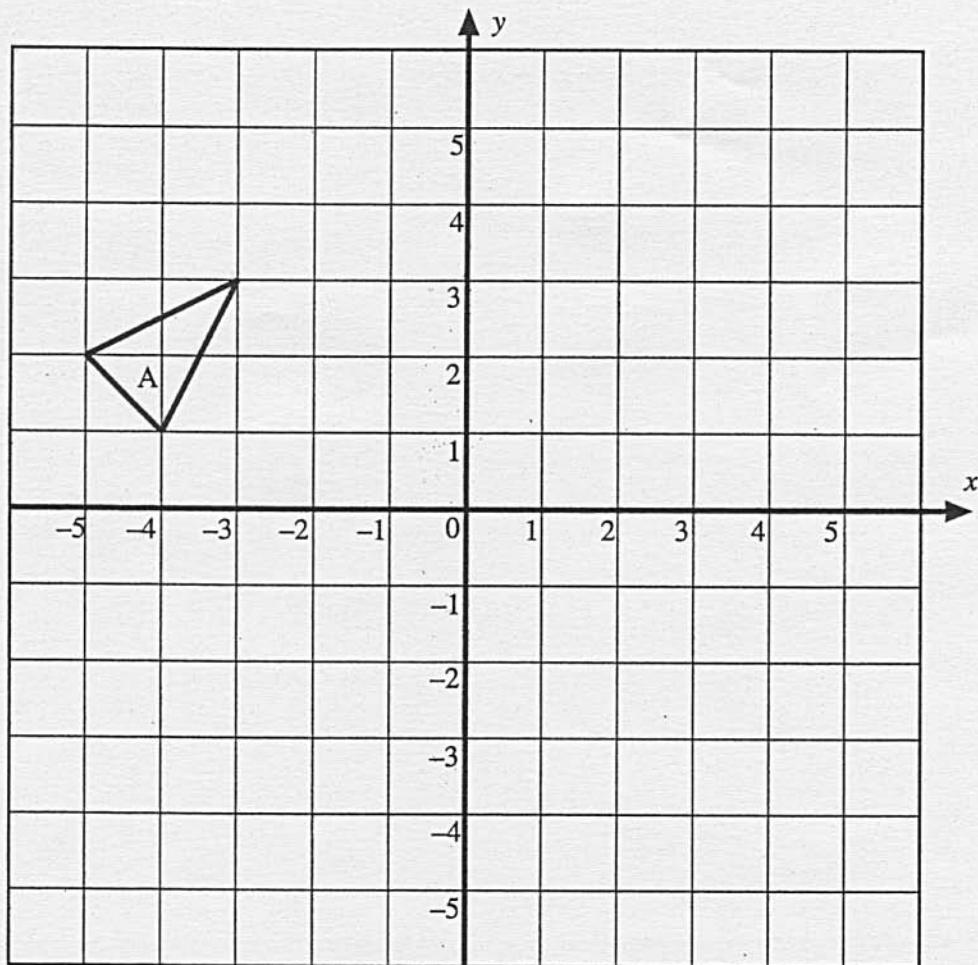
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[1]



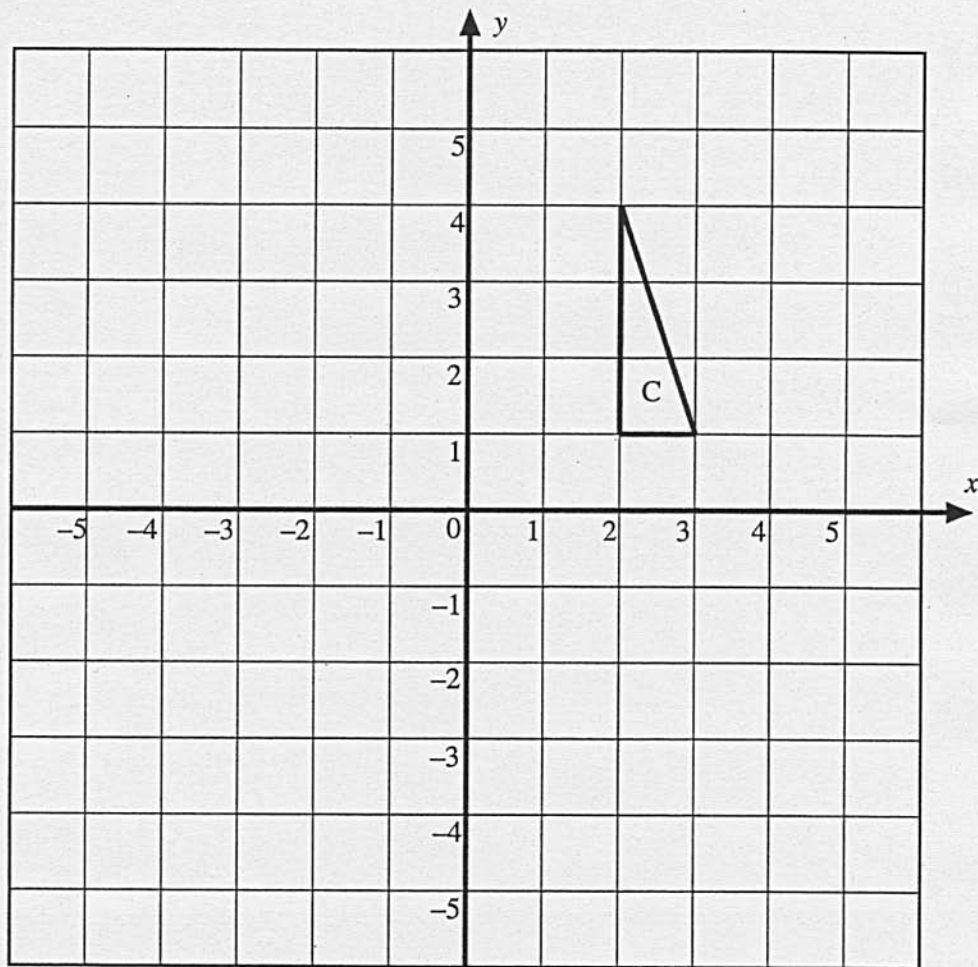
4. (a) Reflect the shape A in the line $y = -x$. Label the image B.

[1]



- (b) Rotate the shape C through 90° anti-clockwise about the point $(1, -2)$.
Label the image D.

[2]



5. A survey of cars was carried out. It was noted whether the cars were up to 3 years old inclusive or over 3 years old. It was also noted whether the cars had a diesel engine or a petrol engine. The results of the survey were as follows.

	Diesel engine	Petrol engine
Up to 3 years old (inclusive)	190	650
Over 3 years old	260	900

Use this information to estimate how many cars with diesel engines you would expect to find in a county known to have 40 000 cars.

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[3]

6. (a) Write 600 as the product of its prime factors in index form.

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[2]

- (b) What is the smallest number that 600 must be multiplied by so that the answer is a square number?

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[1]

7. Find all integer values of n that satisfy the inequality

$$-10 < 5n \leq 17.$$

[3]

8. Solve the following simultaneous equations by an algebraic (not graphical) method.

$$\begin{aligned} 3x - 2y &= 16 \\ x + 3y &= -2 \end{aligned}$$

[4]

9. (a) Write **each** of the following numbers in standard form.

(i) 3895584

[1]

(ii) 0.0000002567

[1]

- (b) Find, in standard form, the value of:

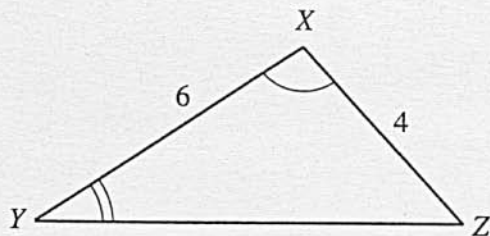
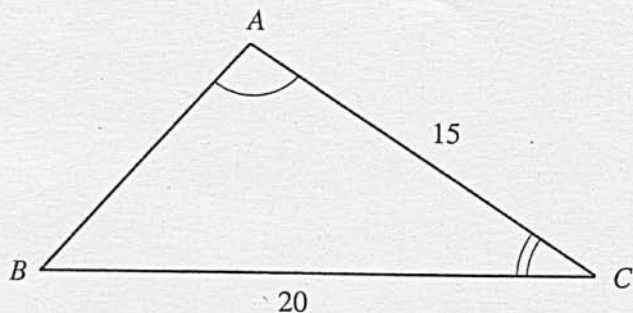
(i) $(4 \times 10^{-4}) \times (1.2 \times 10^{-5})$

[1]

(ii) $\frac{3 \times 10^3}{4 \times 10^{-6}}$

[2]

10. The diagram shows two similar triangles in which $\widehat{BAC} = \widehat{YXZ}$, $\widehat{ACB} = \widehat{XYZ}$, $AC = 15$, $BC = 20$, $XY = 6$ and $XZ = 4$.



Calculate the length of

(a) YZ,

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[2]

(b) AB.

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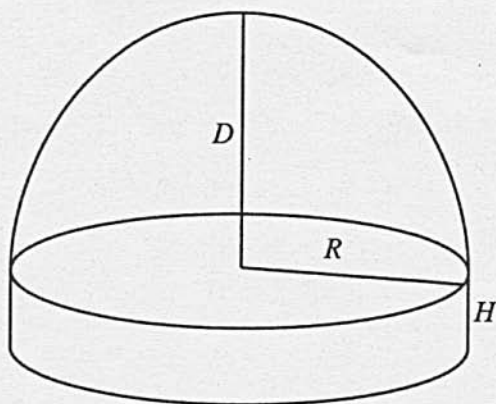
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[2]

11. The diagram shows a solid. The lengths D , R and H are as shown.



One of the following formulae may be used to estimate V , the volume of the solid.

$$V = 3H + 2R + 5D$$

$$V = 3R + 5DR$$

$$V = 3R^2H + 2R^2D$$

$$V = 3R(4D + 5H)$$

- (a) Explain why the formula $V = 3H + 2R + 5D$ cannot be used to estimate the volume of the solid.

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[1]

- (b) State, with a reason, which of the above formulae may be used to estimate the volume of the solid.

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[2]

12. Solve the following equation.

$$5x + 6 - \frac{4x - 1}{2} = 8$$

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[3]

13. At a certain driving test centre a record was kept of the gender and age of each driving test candidate.
On the basis of these records, the probability of a randomly selected driving test candidate being a male under 25 is estimated to be 0.6.
It was also estimated that the probability of a randomly selected driving test candidate being a female under 25 is 0.3.

- (a) Using these estimates, calculate the probability that a randomly selected driving test candidate is not a male under 25.

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[1]

- (b) Consider the next two driving test candidates.
Calculate the probability that

- (i) both are females under 25,

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[2]

- (ii) only one of them is a male under 25.

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[3]

14. (a) Simplify **each** of the following.

(i) $16^{\frac{3}{4}}$

[2]

(ii) $9^{-\frac{1}{2}}$

[1]

(b) Given that $0 < x < 1$ write x , $\frac{1}{x}$ and x^2 in ascending order.

[2]

15. (a) Factorise $16x^2 - 1$.

[2]

(b) Expand $(5 - \sqrt{2})^2$ and state whether the result is rational or irrational.

[2]

16. A, B, C and D are four points on the circumference of a circle centre O .
 AC is a straight line passing through the centre of the circle.
 The tangent PT meets the circle at D .

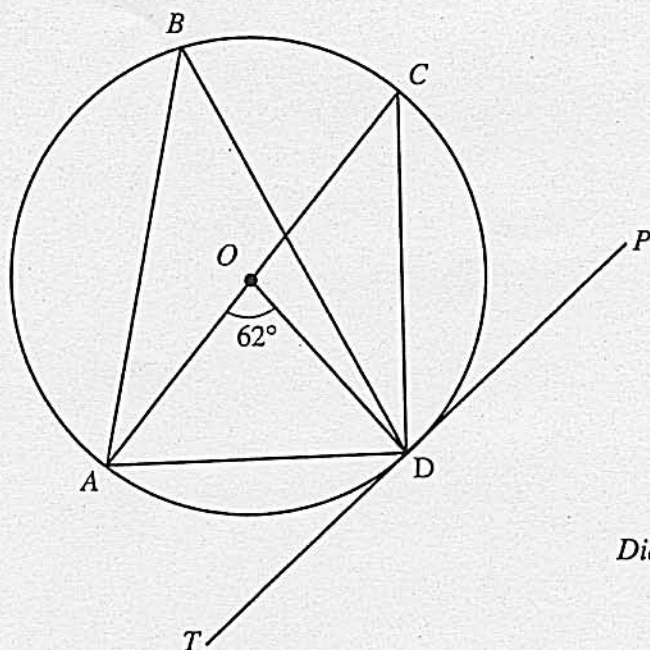


Diagram not drawn to scale.

Given that $\widehat{AOD} = 62^\circ$, find **each** of the following angles. Give reasons for your answers.

(a) \widehat{ABD}

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[2]

(b) \widehat{ADC}

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[2]

(c) \widehat{CAD}

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[2]

(d) \widehat{CDP}

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[2]

17. $ABCD$ is a parallelogram. BAF is a straight line. FE is parallel to AD . $AF = 2BA$ and $FE = 3AD$.

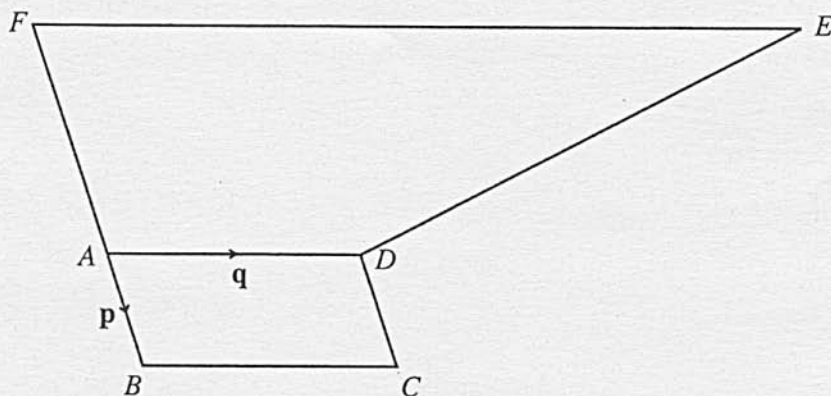


Diagram not drawn to scale.

Given that $\mathbf{AB} = \mathbf{p}$ and $\mathbf{AD} = \mathbf{q}$, express each of the following in terms of \mathbf{p} and \mathbf{q} .

(a) \mathbf{AC}

..... [1]

(b) \mathbf{FE}

..... [1]

(c) \mathbf{BF}

..... [1]

(d) \mathbf{CE}

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 [2]

18. Make t the subject of the following formula.

$$w(5 - 3t) = 2(t + 5)$$

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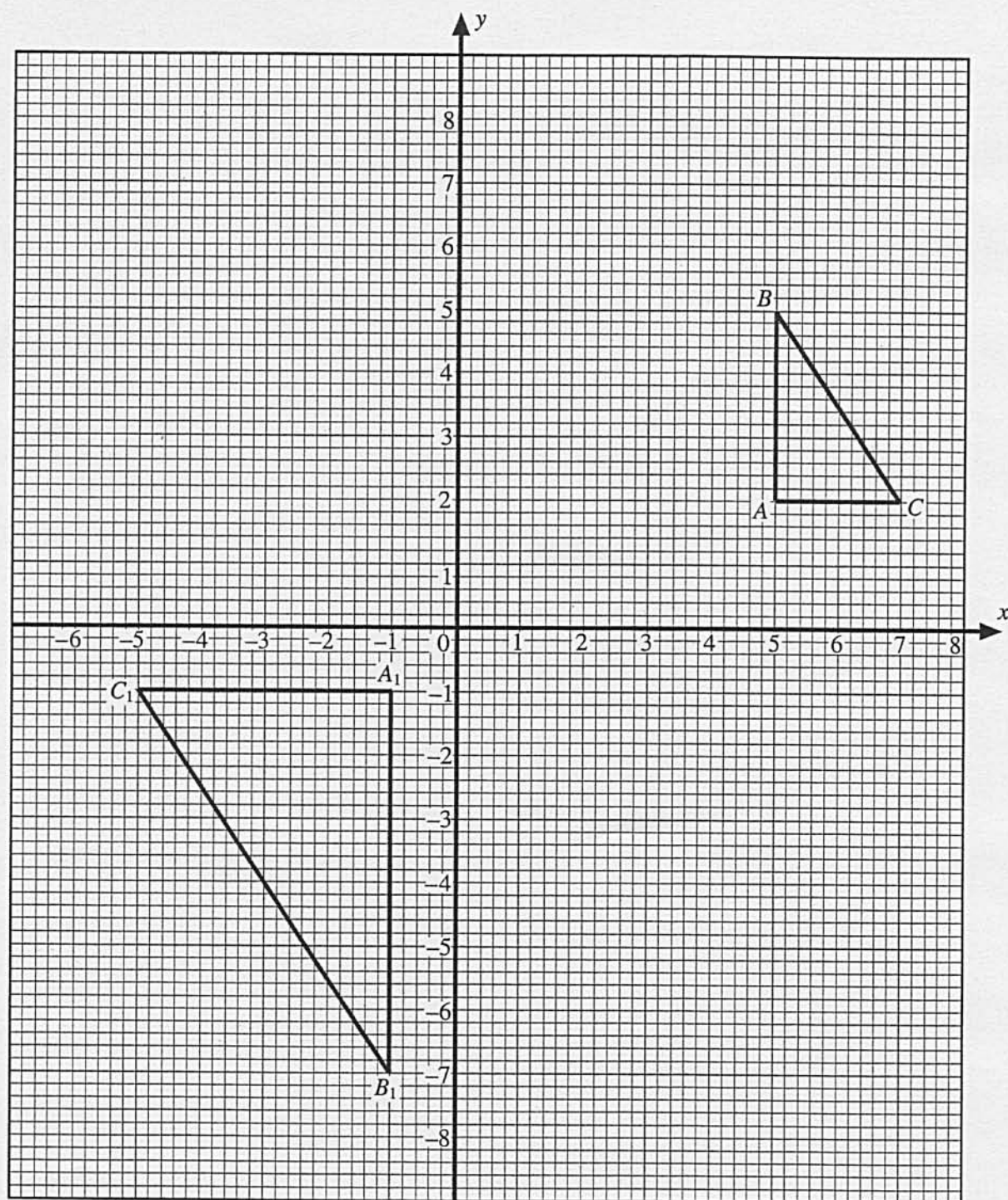
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19. The diagram shows triangles ABC and $A_1B_1C_1$ drawn to scale.



Find the single transformation which takes triangle ABC to triangle $A_1B_1C_1$.

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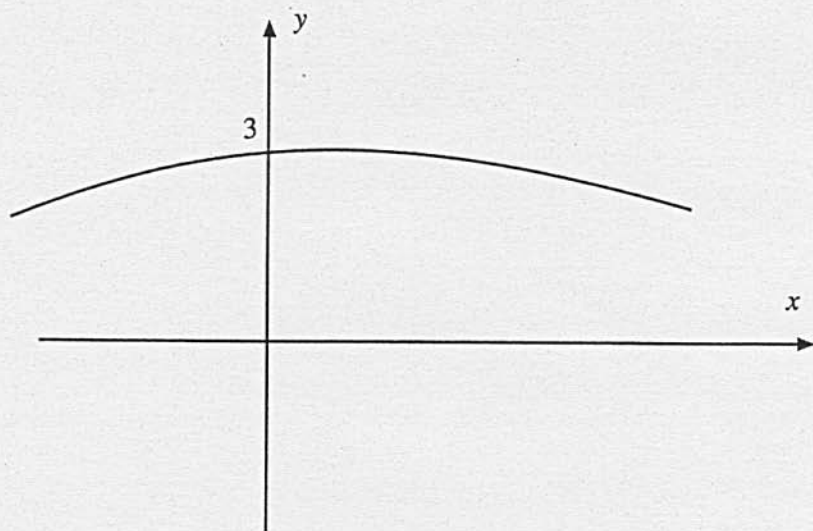
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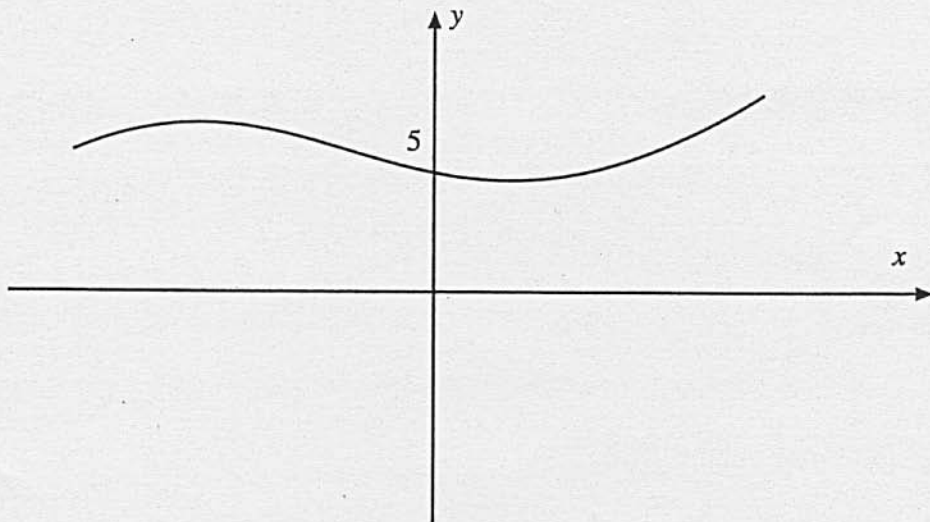
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20. (a) The diagram shows a sketch of $y = f(x)$.
On the same diagram, sketch the curve $y = f(x) - 2$. Mark clearly the coordinates of the point where the curve crosses the y -axis.



[2]

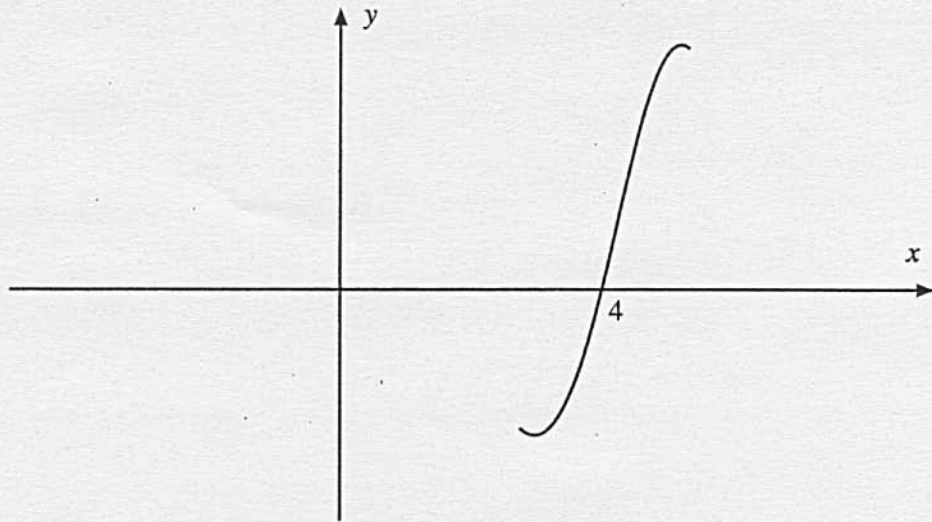
- (b) The diagram shows the sketch of $y = g(x)$.
On the same diagram sketch the curve $y = -g(x)$. Mark clearly the coordinates of the point where the curve crosses the y -axis.



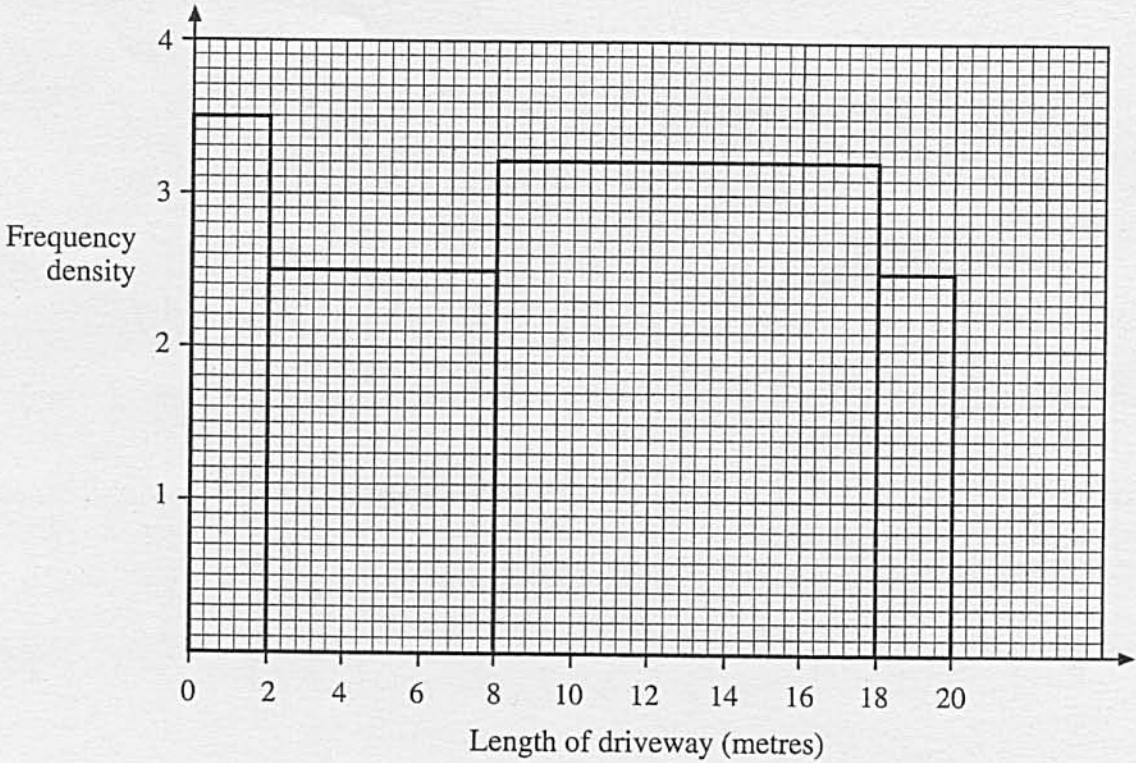
[2]

(c) The diagram shows the sketch of $y = h(x)$.

On the same diagram sketch the curve $y = h(x-3)$. Mark clearly the coordinates of the point where the curve crosses the x -axis.



21. A survey was carried out to measure the lengths of the driveways to a number of houses. The histogram shows the results of the survey.



(a) Use the histogram to calculate the number of driveways measured.

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(b) Find the length exceeded by 75% of the driveways measured. Give your answer to 2 decimal places.

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22. A bag contains 7 banana, 6 cherry, 5 lemon and 2 pineapple flavoured sweets. Two sweets are selected at random without replacement from the bag.

Calculate the probability that

- (a) the two sweets are both banana,

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- (b) the two sweets are either both lemon or both pineapple,

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- (c) exactly one of the sweets is pineapple,

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- (d) at least one of the sweets is lemon.

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