

Mixed Algebra 2

68 min
57 marks

1. (a) You are given the formula $y = \frac{5 + x}{x}$

Rearrange the formula to give x in terms of y .

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Answer $x =$

(3)

(b) Simplify $(3xy^2)^4$.

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Answer

(2)
(Total 5 marks)

2. Solve the simultaneous equations

$$x^2 + y^2 = 16$$

$$y = 3x - 1$$

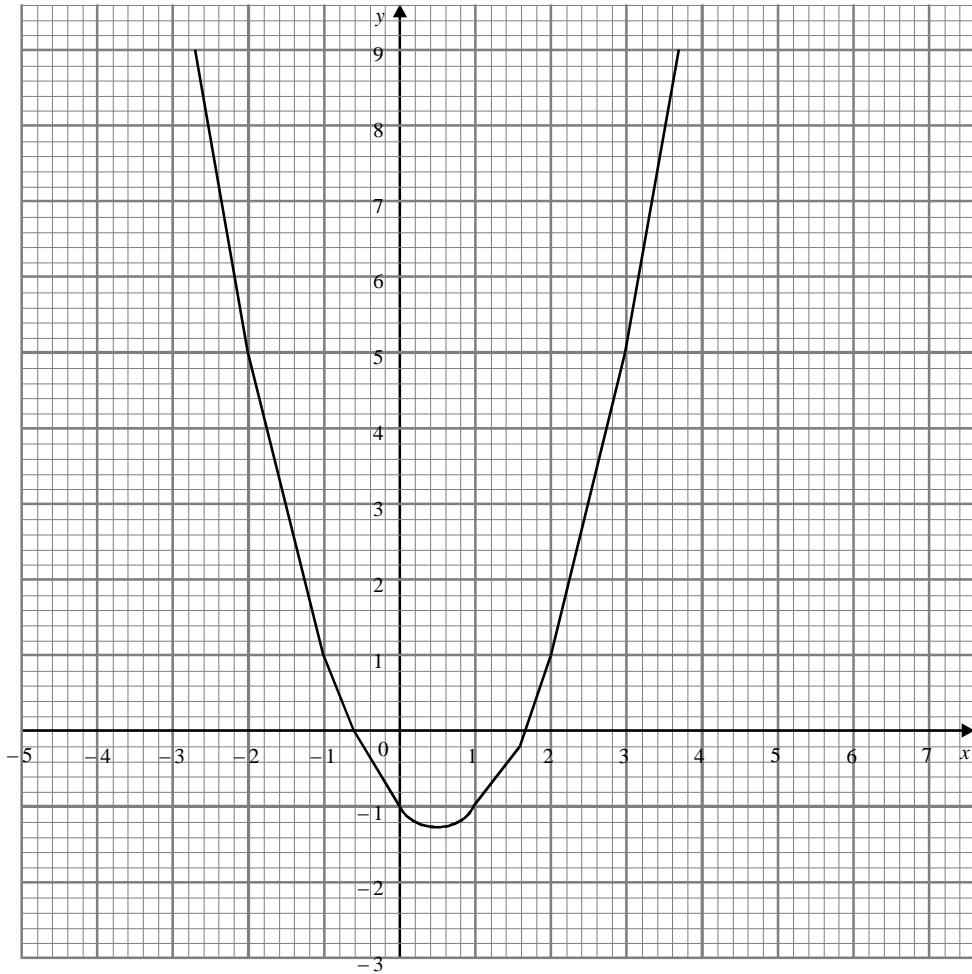
Give your answers to an accuracy of 2 decimal places.

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Answer $x = \dots\dots\dots y = \dots\dots\dots$

(Total 7 marks)

3. A student draws the graph of $y = x^2 - x - 1$ for $-2 \leq x \leq 4$.



(a) (i) Use the graph to solve the equation $x^2 - x - 1 = 2x + 1$.

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Answer

(3)

(ii) Re-write the equation $x^2 - x - 1 = 2x + 1$ in the form of $ax^2 + bx + c = 0$.

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Answer

(1)

(b) Use the graph, or otherwise, to write down the two solutions to the equation

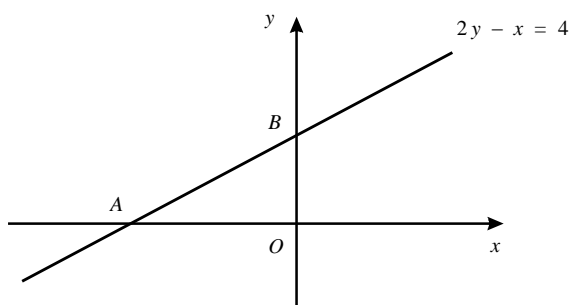
$$(x - 1)^2 - (x - 1) - 1 = 0$$

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Answer

(2)
(Total 6 marks)

4. A sketch of the line $2y - x = 4$ is shown.
The line crosses the axes at A and B .



(a) Calculate the coordinates of A and B .

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Answer A (.....,), B (.....,

(2)

(b) Calculate the gradient of the line AB .

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Answer

(2)

(Total 4 marks)

5. (a) Factorise $7x + 14$

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Answer

(1)

(b) Expand and simplify $4(m + 3) + 3(2m - 5)$

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.....
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Answer

(2)

(c) Solve the simultaneous equations:

$$2x + 3y = 9$$

$$3x + 2y = 1$$

You **must** show all your working.
Do **not** use trial and improvement.

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Answer $x = \dots\dots\dots$, $y = \dots\dots\dots$

(4)

(d) Factorise $x^2 + 6x - 16$

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Answer

(2)

(Total 9 marks)

6. (a) Expand and simplify $4(m + 3) + 3(2m - 5)$

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Answer

(2)

(b) Solve the simultaneous equations:

$$2x + 3y = 9$$

$$3x + 2y = 1$$

You **must** show all your working.
Do **not** use trial and improvement.

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Answer $x = \dots\dots\dots$, $y = \dots\dots\dots$

(4)

(c) (i) Factorise $x^2 + 6x - 16$

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Answer

(2)

(ii) Hence solve the equation $x^2 + 6x - 16 = 0$

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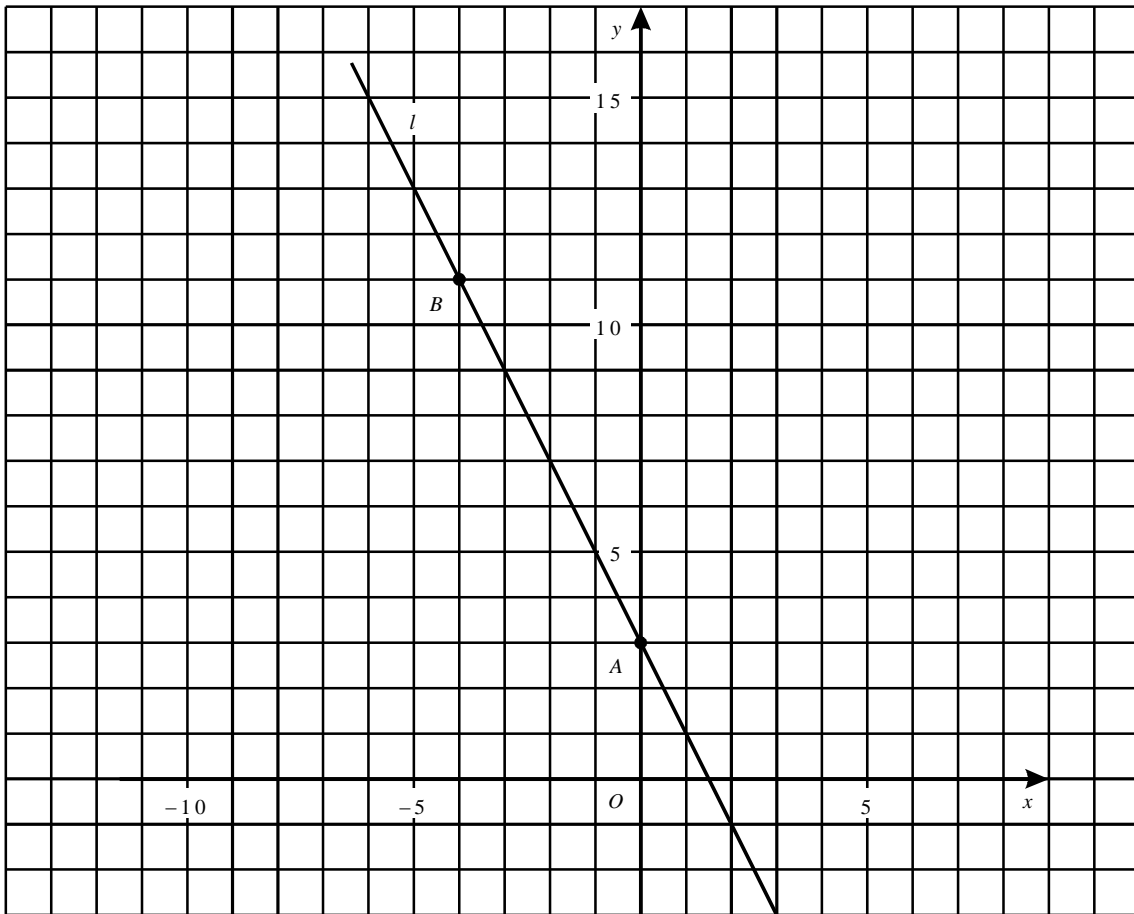
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Answer

(1)

(Total 9 marks)

7. The line l on the graph passes through the points $A(0, 3)$ and $B(-4, 11)$.



- (a) Calculate the gradient of the line l .

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Answer

(2)

- (b) Write down the equation of the line l .

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Answer

(1)

- (c) Write down the equation of the line which also passes through the point $(0, 3)$ but is perpendicular to line l .

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Answer

(2)

(Total 5 marks)

8. W and P are both positive quantities.
 W is directly proportional to the square root of P .
When $W = 12$, $P = 16$.

- (a) Express W in terms of P .

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Answer

(3)

- (b) What is the value of W when $P = 25$?

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Answer

(1)

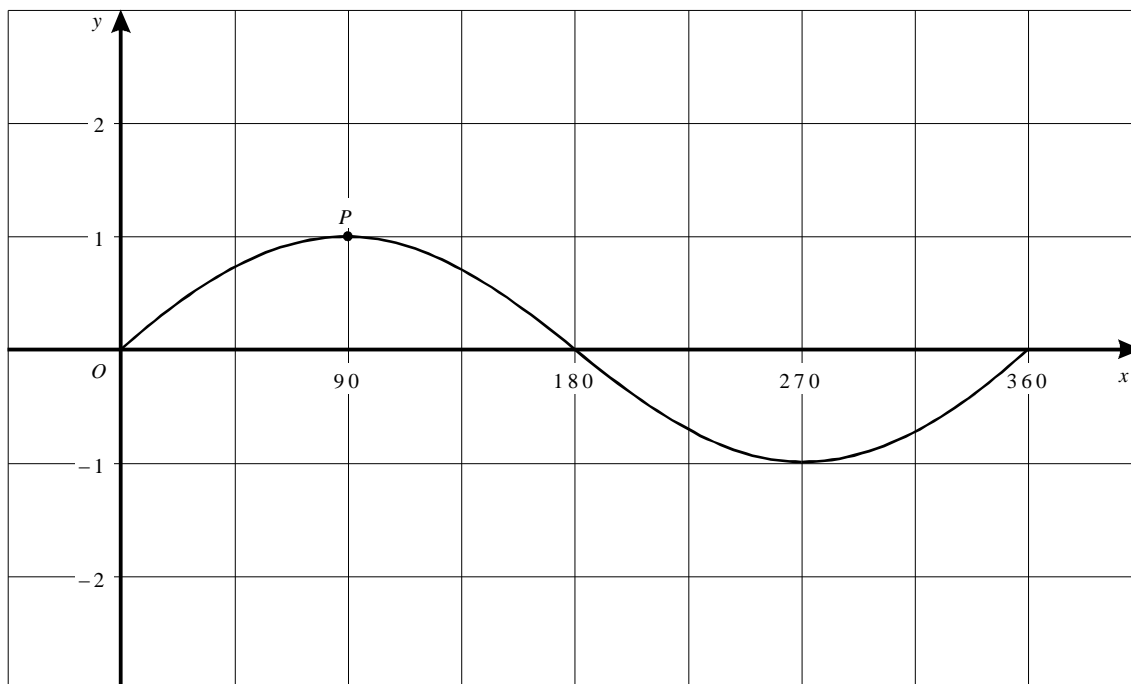
(c) What is the value of P when $W = 21$?

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Answer

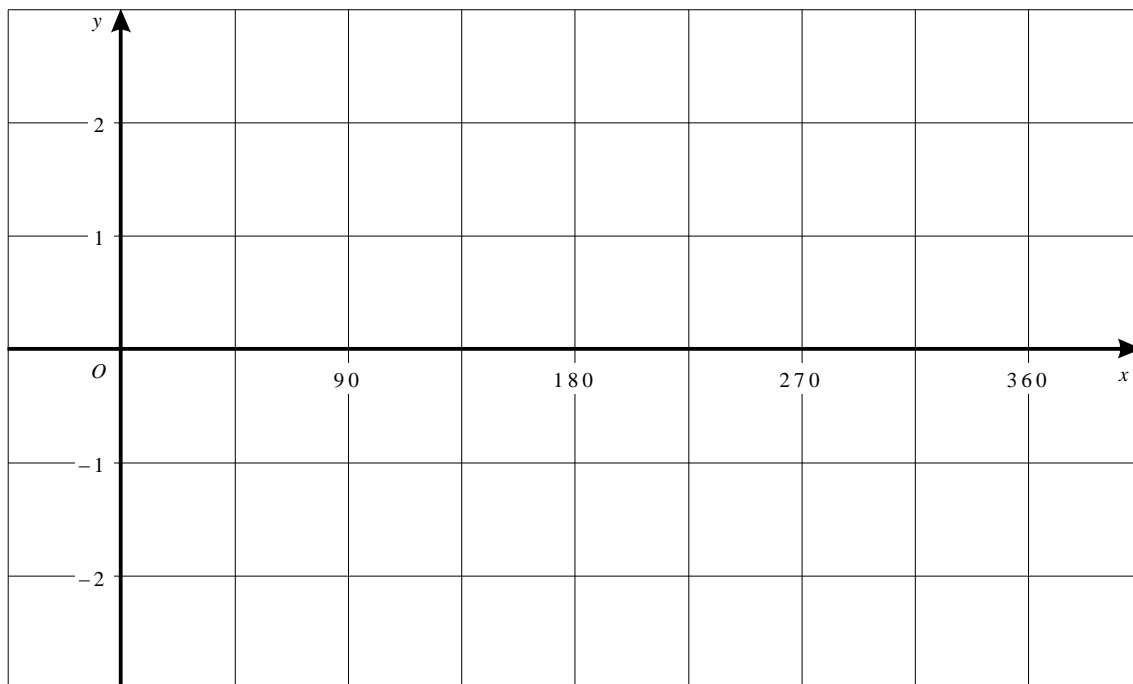
(2)
(Total 6 marks)

9. The graph of $y = \sin x$ for $0^\circ \leq x \leq 360^\circ$ is shown on the grid below.
The point $P(90, 1)$ lies on the curve.



On both of the grids that follow, sketch the graph of the transformed function.
In both cases write down the coordinates of the transformed point P .

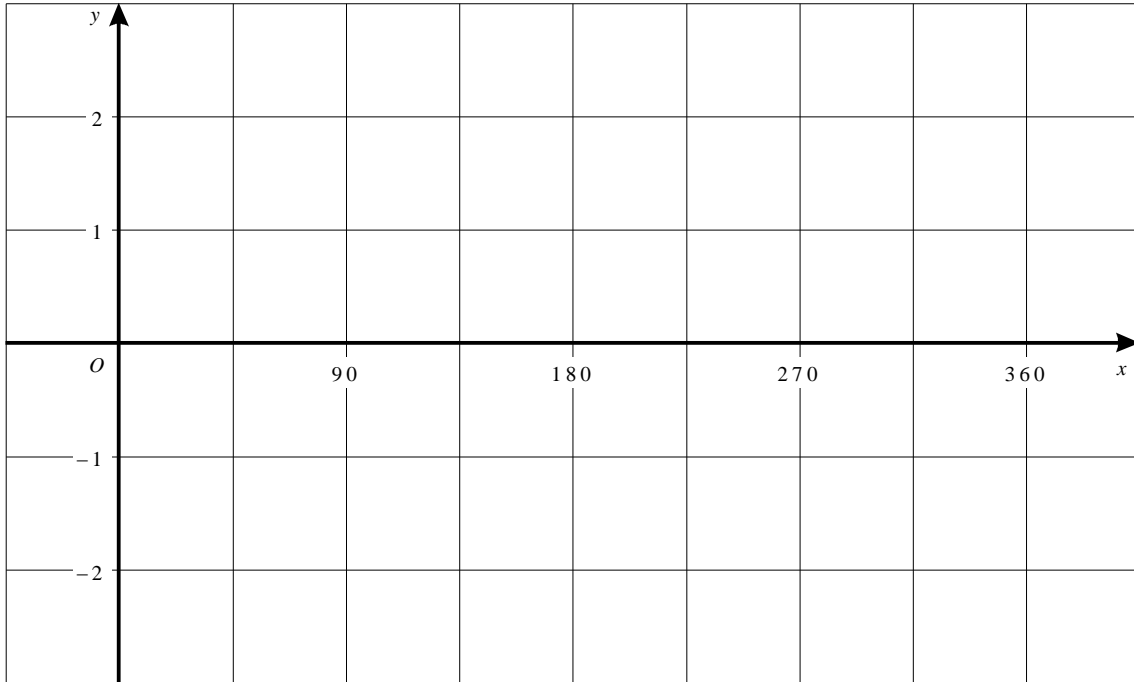
(a) $y = \sin(x - 45)$



P (.....,))

(2)

(b) $y = 2\sin x$



P (.....,) (2)

(Total 4 marks)

10. Find the values of a and b such that

$$x^2 - 10x + 18 = (x - a)^2 + b$$

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Answer $a =$, $b =$

(Total 2 marks)