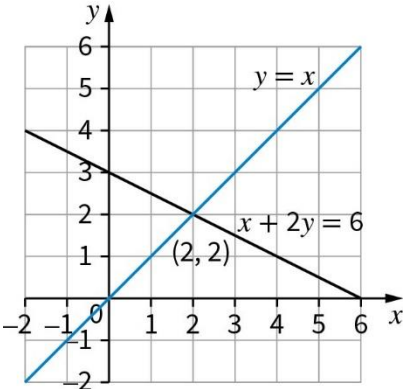


Oxford Revise | AQA GCSE Maths Foundation | Answers

Chapter 12 Simultaneous equations

Question	Answer	Extra information	Marks
12.1	<p>The line to draw is $y = x$</p> <p>The two lines intersect at $(2, 2)$, so $x = 2$ and $y = 2$</p> 	<p>Line $y = x$ correctly drawn</p> <p>Correct coordinates of point of intersection</p>	<p>1</p> <p>1</p>
12.2	<p>The point of intersection is approximately $(2.3, 1.7)$ so $x = 2.3, y = 1.7$</p>	<p>x is (close to) 2.3</p> <p>y is (close to) 1.7</p>	<p>1</p> <p>1</p>

Question	Answer	Extra information	Marks
12.3 (a)	Add the two equations to give $2x = 22$ Thus, $x = 11$ Substitute this into either equation to find y . $11 + y = 14$ $y = 3$	Adding or subtracting the equations to eliminate either x or y . Correct answer	1 1
12.3 (b)	Subtract one equation from the other to give $5y = 10$ Thus, $y = 2$ Substitute this into either equation to find x . $2x - 4 = 4$ $x = 4$	Subtracting one equation from the other to eliminate y . Correct answer for x . Correct answer for y .	1 1 1

Question	Answer	Extra information	Marks
12.3 (c)	$4x + 5y = 37$ (1) $2x + y = 11$ (2) Multiply (2) by 2, and then subtract from (1): $4x + 5y = 37$ $4x + 2y = 22$ <hr style="width: 10%; margin-left: 0;"/> $3y = 15$ $y = 5$ Substitute $y = 5$ into either equation to solve for x . $4x + 25 = 37$ $4x = 12$ $x = 3$	Correct equation in either x or y . Correct answer for x . Correct answer for y .	1 1 1

Question	Answer	Extra information	Marks
12.3 (d)	$3x - 2y = 2$ (1) $12x - 4y = 10$ (2) Multiply (1) either by 4 or by 2 to eliminate x or y , respectively. $12x - 8y = 8$ $12x - 4y = 10$ <hr/> $-4y = -2$ $y = 0.5$ Substitute $y = 0.5$ into either equation to solve for x . $3x - 1 = 2$ $3x = 3$ $x = 1$	Correct equation in either x or y . Correct answer for x . Correct answer for y .	1 1 1

Question	Answer	Extra information	Marks
12.4 (a)	$2x + 5y = 11$ (1) $3x - 2y = -12$ (2) <p>Multiply both equations by suitable constants to eliminate one variable. For example:</p> $6x + 15y = 33$ $6x - 4y = -24$ <hr/> $19y = 57$ $y = 3$ <p>Substitute $y = 3$ into either equation to solve for x.</p> $2x + 15 = 11$ $2x = -4$ $x = -2$	<p>Correct equation in either x or y.</p> <p>Correct answer for x.</p> <p>Correct answer for y.</p>	<p>1</p> <p>1</p> <p>1</p>

Question	Answer	Extra information	Marks
12.4 (b)	$2x - 7y = 12$ (1) $5x - y = -3$ (2) Multiply both equations by suitable constants to eliminate one variable. For example: $10x - 35y = 60$ $\underline{10x - 2y = -6}$ $-33y = 66$ $y = -2$ Substitute $y = -2$ into either equation to solve for x . $2x + 14 = 12$ $2x = -2$ $x = -1$	Correct equation in either x or y . Correct answer for x . Correct answer for y .	1 1 1

Question	Answer	Extra information	Marks
12.4 (c)	$3x + 8y = 12$ (1) $2x + 12y = 13$ (2) Multiply both equations by suitable constants to eliminate one variable. For example: $6x + 16y = 24$ $6x + 36y = 39$ <hr style="width: 100px; margin-left: 0;"/> $20y = 15$ $y = 0.75$ Substitute $y = 0.75$ into either equation to solve for x $3x + 6 = 12$ $3x = 6$ $x = 2$	Correct equation in either x or y . Correct answer for x . Correct answer for y .	1 1 1

Question	Answer	Extra information	Marks
12.4 (d)	$6x - 4y = 9$ (1) $5x + 3y = -2$ (2) Multiply both equations by suitable constants to eliminate one variable. For example: $18x - 12y = 27$ $20x + 12y = -8$ <hr style="width: 10%; margin-left: 0;"/> $38x = 19$ $x = 0.5$ Substitute $x = 0.5$ into either equation to solve for y $3 - 4y = 9$ $-4y = 6$ $y = -1.5$	Correct equation in either x or y . Correct answer for x . Correct answer for y .	1 1 1
12.5 (a)	Let a = cost of an adult ticket, and c = cost of child ticket. $a + 3c = 39$ $2a + 4c = 62$	First equation, using any variables. Second equation	1 1
12.5 (b)	Solve simultaneously to get $a = 15, c = 8$ Thus, an adult ticket costs £15 and a child's ticket costs £8	Correct equation in either a or c . Adult ticket is £15 Child's ticket is £8	1 1 1

Question	Answer	Extra information	Marks
12.6	<p>Let a = mass of an apple, and s = mass of a satsuma.</p> $20a + 30s = 4050$ $12a + 15s = 2205$ <p>Solve simultaneously to get $a = 90, s = 75$</p> <p>Thus, the mass of an apple is 90 g and the mass of a satsuma is 75 g</p>	<p>Correct simultaneous equations</p> <p>Correct equation in either a or s.</p> <p>Apple's mass = 90 g</p> <p>Satsuma's mass = 75 g</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>
12.7	$3x + 2y = 9 \quad (1)$ $x + y = 4 \quad (2)$ <p>Multiply the second equation by 2 or -2 to eliminate y (or by 3 or -3 to eliminate x)</p> <p>For example:</p> $3x + 2y = 9$ $\underline{-3x - 3y = -12}$ $-y = -3$ $y = 3$ <p>Substitute $y = 3$ into either equation to solve for x</p> $x + 3 = 4$ $x = 1$	<p>Either equation stated</p> <p>Correct equation in either x or y.</p> <p>$x = 1$</p> <p>$y = 3$</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>

Question	Answer	Extra information	Marks
12.8	<p>Rearrange the second equation as $a - b = 4$, then subtract from the first equation to eliminate b :</p> $\begin{array}{r} 2a - b = 7 \\ a - b = 4 \\ \hline a = 3 \end{array}$ <p>Substitute this value into either equation to solve for b. Thus, $b = -1$</p>	<p>Rearrange the 2nd equation correctly and then eliminates either a or b.</p> $a = 3$ $b = -1$	<p>1</p> <p>1</p> <p>1</p>
12.9	<p>Let the two numbers be x and y.</p> $\begin{array}{l} x + y = 120 \\ x - y = 50 \end{array}$ <p>Add the two equations to eliminate y.</p> $\begin{array}{l} 2x = 170 \\ x = 85 \end{array}$ <p>Then solve for y.</p> $\begin{array}{l} 85 + y = 120 \\ y = 35 \end{array}$	<p>Attempt to form simultaneous equations</p> <p>Eliminates x or y.</p> 35 85	<p>1</p> <p>1</p> <p>1</p> <p>1</p>

Question	Answer	Extra information	Marks
12.10	$p + q + 3q + p + q + 2p = 22$ $4p + 5q = 22$ <p>Opposite sides are equal in length so:</p> $2p = 3q$ <p>which can be rearranged to</p> $2p - 3q = 0$ <p>Simultaneous equations:</p> $4p + 5q = 22 \quad (1)$ $2p - 3q = 0 \quad (2)$ <p>Multiply (2) by 2 and then subtract the result from (1):</p> $4p + 5q = 22$ $\underline{4p - 6q = 0}$ $11q = 22$ $q = 2$ <p>Substitute this value of q into either (1) or (2) to find that $p = 3$</p>	<p>Attempts to form an equation for the perimeter.</p> <p>Realises that $2p = 3q$ and rearranges this.</p> <p>Eliminates either p or q.</p> $q = 2$ $p = 3$	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>

Questions referring to previous content

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12.11	$12 \geq 3x$, so $x \leq 4$	$12 \geq 3x$ $x \leq 4$ Number line with filled circle at 4 and line indicating everything to the left of 4.	1 1 1	