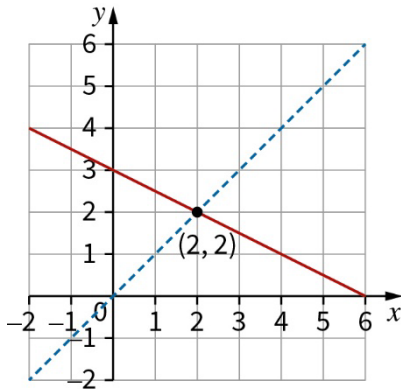


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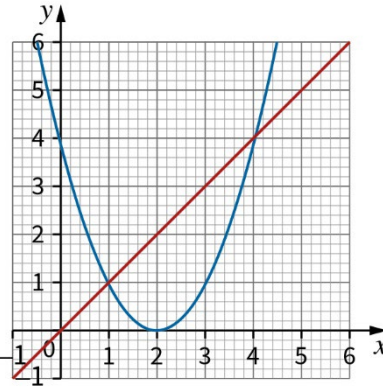
Chapter 11 Solving simultaneous equations

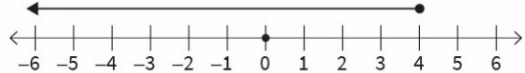
Question	Answer	Extra information	Marks
11.1	The point of intersection is approximately $(2.3, 1.7)$, so the solution is $x = 2.3, y = 1.7$	x is close to 2.3 y is close to 1.7	1 1
11.2	<p>The line to draw is $y = x$</p>  <p>It then becomes easy to see that this line intersects $x + 2y = 6$ at $(2, 2)$</p>	Line $y = x$ drawn Correct answer	1 1
11.3 (a)	<p>Add the equations to get $2x = 22$</p> <p>Thus $x = 11$</p> <p>Substitute this into either equation to get</p> <p>$y = 3$</p>	<p>Adding or subtracting to eliminate one variable</p> <p>$x = 11$</p> <p>$y = 3$</p>	1 1 1

Question	Answer	Extra information	Marks
11.3 (b)	Subtract the first equation from the second to get $5y = 10$ Thus $y = 2$ Substitute this into either equation to get $x = 4$	Eliminating one variable $y = 2$ $x = 4$	1 1 1
11.3 (c)	Multiply the second equation by 2 and then subtract from the first to get $3y = 15$ Thus $y = 5$ Substitute this into either equation to get $x = 3$	Eliminating one variable $y = 5$ $x = 3$	1 1 1
11.3 (d)	Multiply the first equation by 2 and then subtract from the second to get $6x = 6$ Thus $x = 1$ Substitute this into either equation to get $y = 0.5$	Eliminating one variable $x = 1$ $y = 0.5$	1 1 1
11.4 (a)	Multiply the first equation by 3, the second equation by -2 , and then add to get: $19y = 57$ Thus $y = 3$ Substitute this into either equation to get $x = -2$	Correct equation in either x or y x solution y solution	1 1 1

Question	Answer	Extra information	Marks
11.4 (b)	Multiply the first equation by 5, the second equation by -2 , and then add to get: $-33y = 66$ Thus $y = -2$ Substitute this into either equation to get $x = -1$	Correct equation in either x or y x solution y solution	1 1 1
11.4 (c)	Multiply the first equation by 2, the second equation by -3 , and then add to get: $-20y = -15$ Thus $y = 0.75$ Substitute this into either equation to get $x = 2$	Correct equation in either x or y x solution y solution	1 1 1
11.4 (d)	Multiply the first equation by 5, the second equation by -6 , and then add to get: $-38y = 57$ Thus $y = -1.5$ Substitute this into either equation to get $x = 0.5$	Correct equation in either x or y x solution y solution	1 1 1
11.5 (a)	a = adult ticket price c = child ticket price $a + 3c = 39$ $2a + 4c = 62$	One equation, with any variable letters Both equations	1 1
11.5 (b)	Solve simultaneously to get: Adult ticket = £15, child ticket = £8	Correct equation in either a or c a solution c solution	1 1 1

Question	Answer	Extra information	Marks
11.6	<p>Let a be the mass of an apple, and s be the mass of a satsuma.</p> $20a + 30s = 4050$ (1) $12a + 15s = 2205$ (2) $(2) \times 2: 24a + 30s = 4410$ (3) $(3) - (1): 4a = 360; a = 90$ Substituting into (2): $1080 + 15s = 2205; 15s = 1125; s = 75$ The mass of an apple is 90 g and the mass of a satsuma is 75 g	<p>Correct simultaneous equations</p> <p>Correct equation in either a or s</p> <p>Apple mass of 90 g</p> <p>Satsuma mass of 75 g</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>
11.7	$2^{x+y} = 64 = 2^6$ $x + y = 6$ $2^{x-y} = 4 = 2^2$ $x - y = 2$ Solve simultaneously to get $x = 4, y = 2$	<p>Attempting to rewrite 64 and 2 with base 2</p> <p>Either equation correct</p> <p>Attempting to solve simultaneously</p> <p>Correct values for x and y</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>

Question	Answer	Extra information	Marks
11.8	$x = 1, y = 1$ and $x = 4, y = 4$ 	Correct drawing of $y = (x - 2)^2$ Correct drawing of $y = x$ 1 and 1 4 and 4	1 1 1 1
11.9 (a)	$x^2 + 3x - 2 = 3 - x$ $x^2 + 4x - 5 = 0$ $(x + 5)(x - 1) = 0$ When $x = 1, y = 2$ When $x = -5, y = 8$	Attempt to form an equation in x only Rearranging to make RHS = 0 Factorising correctly or both x values correct Correct answer	1 1 1 1
11.9 (b)	$2(-2y)^2 + y^2 = 9$ $9y^2 = 9$ $y = \pm 1$ When $y = 1, x = -2$ When $y = -1, x = 2$	Attempt to form an equation in y only Rearranging to make RHS = 0 Both y values or one correct pair of x and y Correct answer	1 1 1 1

Question	Answer	Extra information	Marks
11.10 (a)	$(-1, -14)$ and $(6, 0)$	Line $y = 2x - 12$ correctly drawn $(-1, -14)$ $(6, 0)$	1 1 1
11.10 (b)	$x \approx -2.5, x \approx 5.5$	Draw the line $y = -4$ Estimate one intersection of the quadratic and $y = -4$ Estimate both x values	1 1 1
11.11	$11 + 2x \geq 5x - 1$ $12 \geq 3x$ $x \leq 4$ 	Solve the inequality Show the inequality correctly on a number line	1 1
11.12	$6x^2 + 7x - 20 > 0$ Factorise as $(3x - 4)(2x + 5) > 0$ Roots are $x = \frac{4}{3}$, and $x = -\frac{5}{2}$ The quadratic is U shaped so it is positive (> 0) when $x > \frac{4}{3}$, and $x < -\frac{5}{2}$ In set notation: $\left\{x : x > \frac{4}{3} \cup x < -\frac{5}{2}\right\}$	Quadratic correctly factorised Roots found Inequalities correctly identified Fully correct answer, in set notation	1 1 1 1