

Question	Answer
1	<p> $2x$ two more than x $x + 2$ x less than two $2 - x$ two less than x $x - 2$ x multiplied by two </p>
2	<p>a)</p> <p> $k + 4$ $2k + 2$ $4k + 3$ </p> <p>b) A has more balls than B. <input type="checkbox"/> B has more balls than A. <input type="checkbox"/> More information is needed to know which has more. <input checked="" type="checkbox"/></p>
3	<p>a) $8p + 5t$ b) $16p + 30t$ c) $16p + 10t$ d) $12p + 5t$</p>
4	<p> $h \rightarrow \times 5 \rightarrow + 2 \rightarrow 5(h + 2)$ $h \rightarrow + 2 \rightarrow \times 5 \rightarrow 5h + 2$ $h \rightarrow \div 2 \rightarrow + 5 \rightarrow \frac{h}{2} + 5$ $h \rightarrow + 5 \rightarrow \div 2 \rightarrow \frac{h + 5}{2}$ </p>
5	<p>a) $\text{£}m + 4$ b) $\text{£}2j$ c) $\text{£}v + 2y$</p>

Y8 - Spring - Block 1 - Step 1 - Form algebraic expressions Answers (continued)

Question	Answer
6	a) He has only taken 2 from the total. He needs to have taken 2 from each box. b) $3(g - 2)$ or $3g - 6$ There are two possible expressions.
7	$£12r + 36m$

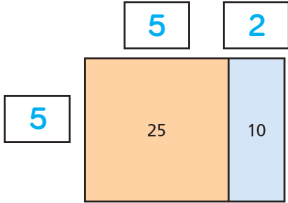
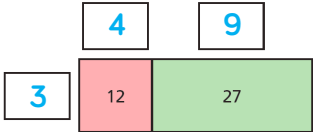
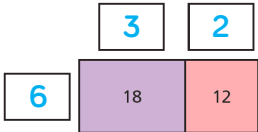
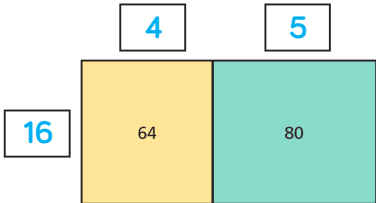
Question	Answer
1	<p>a) Seven add six is equal to six add seven. $7 + 6 = 6 + 7$</p> <p>b) Five multiplied by nine is equal to nine multiplied by five. $5 \times 9 = 9 \times 5$</p> <p>c) Negative ten add six is equal to six add negative ten. $-10 + 6 = 6 + -10$</p> <p>d) Eight subtract three is equal to eight add negative three. $8 - 3 = 8 + -3$</p> <p>e) Three multiplied by negative two is equal to negative three multiplied by two. $3 \times -2 = -3 \times 2$</p> <p>f) Negative four multiplied by negative five is equal to four multiplied by five. $-4 \times -5 = 4 \times 5$</p>
2	<div style="display: flex; flex-wrap: wrap; justify-content: space-around;"> <div style="border: 1px solid black; background-color: #fff9c4; padding: 5px; margin: 5px;">$f + f + f - g - g$ ✓</div> <div style="border: 1px solid black; background-color: #c8e6c9; padding: 5px; margin: 5px;">$3f + -2g$ ✓</div> <div style="border: 1px solid black; background-color: #e1bee7; padding: 5px; margin: 5px;">$f + f + f - g + g$</div> <div style="border: 1px solid black; background-color: #bbdefb; padding: 5px; margin: 5px;">$-2g + 3f$ ✓</div> <div style="border: 1px solid black; background-color: #ffe0b2; padding: 5px; margin: 5px;">$f + f + f - (g + g)$ ✓</div> <div style="border: 1px solid black; background-color: #fff176; padding: 5px; margin: 5px;">$2g - 3f$</div> </div>
3	<p>a) -2 b) -45 c) 13 d) -3</p>
4	<p>sometimes true When x is greater than zero, $y - x$ is less than y, but if x is zero or negative, then $y - x$ is not less than y, e.g.:</p> <p>$x = 2$: $y - x$ is 2 less than y. $x = 0$: $y - x = y$ $x = -2$: $y - x = y + 2$, which is 2 more than y.</p>
5	<p>a) $x = -4$ b) $y = -2.5$ c) $k = -21$ d) $a = -3$ e) $h = -1$ f) $x = 3$</p>
6	<p>He has worked out the value of $5x - 7$, not $7 - 5x$. He should have done $7 - -40 = 47$</p>

Y8 – Spring – Block 1 – Step 2 – Use directed number with algebra Answers (continued)

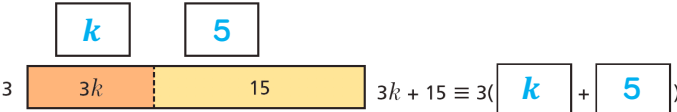
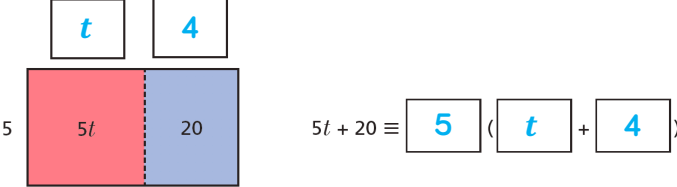
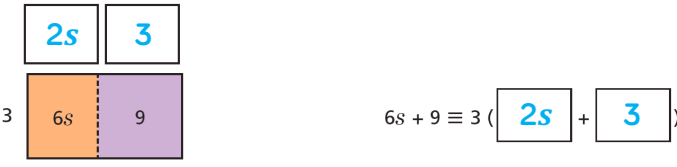
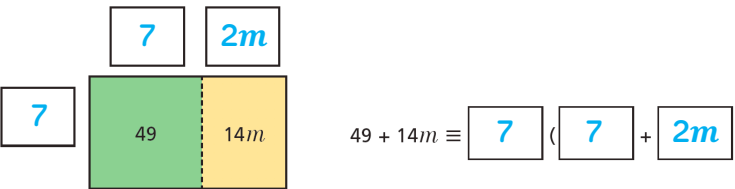
Question	Answer									
7	a) $3t$ b) $-3k$ c) $-5p$ d) $-4x$ e) $-8n$ f) $-5k$									
8	a) $3d + 4$ b) $3h - t + 2$ c) $-2v - 2$									
9	<table border="0" style="width: 100%;"> <thead> <tr> <th style="width: 50%;"></th> <th style="width: 20%; text-align: center;">True</th> <th style="width: 30%; text-align: center;">False</th> </tr> </thead> <tbody> <tr> <td>When $x = -5$, $x^2 = -25$</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> <tr> <td>When $y = -2$, $3y^2 = 36$</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </tbody> </table> <p>A negative number squared is positive. Order of operations means that the square should be done before the multiplication.</p>		True	False	When $x = -5$, $x^2 = -25$	<input type="checkbox"/>	<input checked="" type="checkbox"/>	When $y = -2$, $3y^2 = 36$	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	True	False								
When $x = -5$, $x^2 = -25$	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
When $y = -2$, $3y^2 = 36$	<input type="checkbox"/>	<input checked="" type="checkbox"/>								

Y8 – Spring – Block 1 – Step 3 – Multiply out a single bracket Answers

Question	Answer						
1	a) The bar model shows two times the bar model for $b + 5$ b) <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 60px;">b</td> <td style="width: 60px;">5</td> </tr> <tr> <td>b</td> <td>5</td> </tr> <tr> <td>b</td> <td>5</td> </tr> </table>	b	5	b	5	b	5
b	5						
b	5						
b	5						
2	a) $2x + 6$ b) $5p + 35$						
3	a) $3t + 6$ b) $20 + 4k$ c) $6p + 2$						
4	a) $7y + 28$ b) $5p - 10$ c) $48 + 6g$ d) $12e + 9$ e) $45t - 9$ f) $3a + 3b$ g) $8m + 4k$ h) $21p - 14q$						
5	a) $35 + 5d$ b) $n^2 + 7n$ c) $2k^2 + 4kt$ d) $ak^2 + a^2k$						
6	For the second term, she has worked out $4 - 3$, not 4×-3 $8p - 12$						
7	a) $2(4j + 5) \equiv 8j + 10$ b) $5(4k + 7) \equiv 20k + 35$ c) $9(2m - 9) \equiv 18m - 81$						
8	a) $-3f - 21$ b) $-4w + 24$ c) $20 - 10k$ d) $3n^2 + 24n$						
9	15 years						

Question	Answer
1	<p>a) </p> <p>b) </p> <p>c) </p> <p>d) </p> <p>Parts c) and d) could be completed differently, as the two numbers have more than one common factor. Part c) could have height 3 and lengths 6 and 4, or height 2 and lengths 9 and 6 Part d) could have height 8 and lengths 8 and 10, or height 4 and lengths 16 and 20, or height 2 and lengths 32 and 40</p>

Y8 – Spring – Block 1 – Step 4 – Factorise into a single bracket Answers (continued)

Question	Answer
2	<p>a)  $3k + 15 \equiv 3(k + 5)$</p> <p>b)  $5t + 20 \equiv 5(t + 4)$</p> <p>c)  $6s + 9 \equiv 3(2s + 3)$</p> <p>d)  $49 + 14m \equiv 7(7 + 2m)$</p>
3	<p>There are three ways: $2(12k + 8)$ $4(6k + 4)$ $8(3k + 2)$</p>
4	<p>a) $2(2k + h)$ b) $x(7 + x)$</p>
5	<p>a) $3(m + 4)$ b) $3(3m + 4)$ c) $2(5y - 4)$ d) $5(4 + 5x)$ e) $6(7 - 2y)$ f) $8(2p + 3n)$ g) $6(d - 1)$ h) $g(g + 5)$</p>

Y8 – Spring – Block 1 – Step 4 – Factorise into a single bracket Answers (continued)

Question	Answer
6	<p>multiple possible answers, e.g.:</p> <p>The diagram illustrates three different factorizations of the expression $12a^2b + 6ab^2$ into a single bracket:</p> <ul style="list-style-type: none"> A red rectangle with width $6ab$ and height $2a + b$. A purple rectangle with width $6a$ and height $2ab + b^2$. A green rectangle with width ab and height $12a + 6b$.
7	<p>a) $t(t + 1)$ b) $t(t + 1) = 13$ would mean that two consecutive integers multiply to make 13, and the only factor pair of 13 (1 and 13) is non-consecutive. c) None of the factor pairs of 14 are consecutive. d) If t is even, $t + 1$ is odd. If t is odd, $t + 1$ is even. odd \times even = even, so $t(t + 1)$ must be even.</p>

Y8 – Spring – Block 1 – Step 5 – Expand multiple single brackets and simplify Answers

Question	Answer
1	a) $6h + 19$ b) $6h + 9$ c) $11h + 15$ d) $12h + 15$
2	a) $3h + 15$ b) $4h + 24$ c) $7h + 39$ d) $8p + 12q$ e) $2p + 2q$ f) $10p + 14q$
3	<p> $2(x - 3) + 4(x + 3)$ $2(x - 4) + 4(x + 2)$ $2(2x + 1) + 2(x + 2)$ $2(2x + 1) + 4(2x + 2)$ $3(x - 3) + 3(x + 3)$ $2(4x + 3) + 4(x + 1)$ </p>
4	a) $5r + 4$ b) $12m - 7$
5	a) $31p + 13$ b) $15n - 41$ c) $57p + 30$ d) $2y$
6	$-2 \times 4 = -8$ not $+8$ $3p + 7$

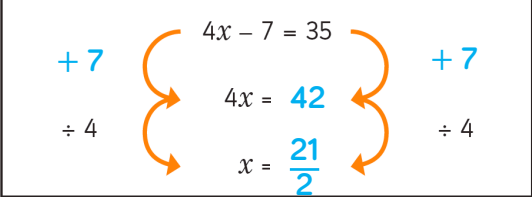
Y8 - Spring - Block 1 - Step 5 - Expand multiple single brackets and simplify Answers (continued)

Question	Answer
7	a) $4t + 9$ b) $4t + 21$
8	a) 10 b) $2(x + 6) + 3(x - 4) - 5(x - 2) \equiv 2x + 12 + 3x - 12 - 5x + 10 \equiv 10$
9	a) $3k^2 + 8k$ b) $6k^2 + 16k + 16$

Y8 – Spring – Block 1 – Step 6 – Expand a pair of binomials Answers

Question	Answer
1	a) 943 b) 4,368
2	$x^2 + 7x + 10$
3	a) $x^2 + 5x + 6$ b) $x^2 + 5x + 4$ c) $2x^2 + 5x + 3$ d) $x^2 + 5x + 6$
4	a) $x^2 + 4x + 3$ b) $k^2 + 9k + 8$ c) $2b^2 + 16b + 24$
5	$(x + 3)^2 \equiv (x + 3)(x + 3) \equiv x^2 + 6x + 9$
6	a) $x^2 + 3x - 10$ b) $x^2 - 3x - 10$
7	a) $p^2 + 3p - 18$ b) $t^2 - 3t - 28$ c) $u^2 - 6u + 8$ d) $2x^2 + x - 10$
8	a) $2m^2 + 6m + 4$ b) $t^2 + 8t + 16$
9	$x^2 - 25$ $x^2 - 9$ $4x^2 - 16$ $25 - a^2$ All the expressions are the difference of two squares.
10	a) $x^2 + 2ax + a^2$ b) $x^2 + ax + bx + ab$ c) $x^2 + ax - bx - ab$ d) $x^2 - a^2$

Y8 - Spring - Block 1 - Step 7 - Solve equations, including with brackets Answers

Question	Answer
1	a) $p = 9$ b) $y = 9$ c) $v = 5$ d) $h = \frac{17}{4}$ e) $t = 21$ f) $r = -7$
2	a) $m = 7$ b) $m = 7$ c) $m = 11$
3	 <p> $4x - 7 = 35$ $+7$ $+7$ $4x = 42$ $\div 4$ $\div 4$ $x = \frac{21}{2}$ </p>
4	a) $w = -1$ b) $m = 10$ c) $v = 10$ d) $k = -3$ e) $b = 18$ f) $n = 11$
5	16 chocolates
6	a) $4(x - 7) = 32$ $4(x - 7) = 32$ $4x - 28 = 32$ $x - 7 = 8$ $4x = 60$ $x = 15$ $x = 15$ b) $x = 4$ $x = \frac{11}{4}$

Question	Answer
7	<div style="border: 1px solid black; background-color: #d9ead3; padding: 5px;">$-2(3 - 4x) = 16$</div> <div style="border: 1px solid black; background-color: #fff2cc; padding: 5px;">$-6 + 8x = 16$</div> <div style="border: 1px solid black; background-color: #d9e1f2; padding: 5px;">$8x = 22$</div> <div style="border: 1px solid black; background-color: #ead1dc; padding: 5px;">$x = 22 \div 8$</div> <div style="border: 1px solid black; background-color: #f4cccc; padding: 5px;">$x = 2.75$</div> <p>The first step could be to divide by 2 or -2</p>
8	<p>a) $f = 3$</p> <p>b) $g = -2$</p> <p>c) $t = 8$</p> <p>d) $c = \frac{8}{3}$</p>

Y8 - Spring - Block 1 - Step 8 - Form and solve equations with brackets Answers

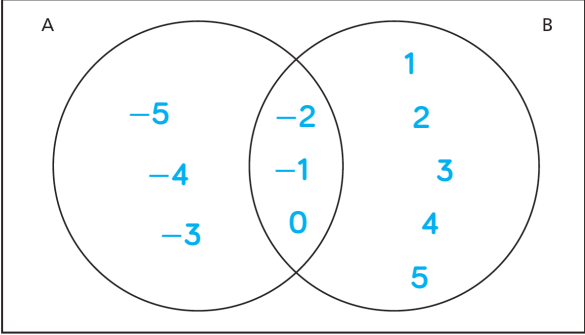
Question	Answer
1	a) $4x + 6 = 42$ b) $x = 9$ c) $4(x + 6) = 42$ so $x = \frac{9}{2}$
2	a) $3x + 5 = 26$ 7 counters b) $4(k - 3) = 24$ $k = 9$
3	$1,000 - 4x = 500$ 125 ml
4	a) $6(h - 3) = 48$ $h = 11$ b) 28 cm
5	a) $3x + 3(x + 20) = 540$ $x = 80$ small bar = 80p, large bar = £1 b) 5 large bars or 1 large bar and 5 small bars A large bar costs £1, so the number of small bars $\times 80$ must be a multiple of 100. This is only the case for 0 or 5 small bars.
6	area = 57.5 cm^2

Question	Answer																				
1																					
2	<p>a) h is greater than negative 2 b) m is less than or equal to 4 c) w is greater than or equal to negative 2 and less than 6</p>																				
3	<p>No. The number does not need to be an integer. For example, the number could be 3.99</p>																				
4	<p>multiple possible answers, e.g.:</p> <p>a) 7, 2.4, -17, 0, 1 b) 9, 8.1, 100, 263, 1,029.4 c) 3, 0, -5, -21, 2.5 d) 5, 10, 20, 100, 17.9 e) 1, 3, 4.7, 6, 7.9</p>																				
5	<table border="0"> <tr> <td>a)</td> <td>0</td> <td>6</td> <td>-8</td> <td>1.8</td> </tr> <tr> <td>b)</td> <td>-2</td> <td>-1</td> <td>2</td> <td>5</td> </tr> <tr> <td>c)</td> <td>12</td> <td>0</td> <td>-12</td> <td>-3</td> </tr> <tr> <td>d)</td> <td>-5</td> <td>2.5</td> <td>0</td> <td>5</td> </tr> </table>	a)	0	6	-8	1.8	b)	-2	-1	2	5	c)	12	0	-12	-3	d)	-5	2.5	0	5
a)	0	6	-8	1.8																	
b)	-2	-1	2	5																	
c)	12	0	-12	-3																	
d)	-5	2.5	0	5																	
6	<p>a) $x > -4$ b) $w \leq 14$ c) $p \geq 4$</p>																				
7	<p>Replace the = sign with the inequality sign.</p>																				

Y8 - Spring - Block 1 - Step 9 - Understand and solve simple inequalities Answers (continued)

Question	Answer
8	a) $x > 5$ b) $x \leq 15$ c) $y < \frac{9}{2}$ d) $p > \frac{11}{3}$ e) $t \leq \frac{5}{4}$
9	a) $-2, -1, 0, 1, 2, 3, 4, 5$ b) $-4, -3, -2, -1, 0, 1, 2, 3, 4, 5$ c) $-3, -2, -1, 0$
10	<p>Esther has made two mistakes. $-12 \div -3 = 4$, not -4 When dividing an inequality by a negative number, the direction of the inequality needs to change.</p> <div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 10px auto;"> $\begin{array}{ccc} -8 & \begin{array}{c} \left. \begin{array}{l} -3x + 8 < -4 \\ -3x < -12 \end{array} \right\} -8 \\ \div -3 & \begin{array}{c} \left. \begin{array}{l} -3x < -12 \\ x > 4 \end{array} \right\} \div -3 \end{array} & -8 \\ & & \div -3 \end{array}$ </div>
11	$t \geq 1$

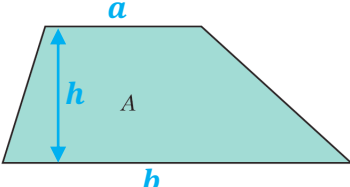
Y8 - Spring - Block 1 - Step 10 - Form and solve inequalities Answers

Question	Answer
1	$3x - 10 < 5$ $x < 5$
2	a) $5x - 3 < 80$ $x < \frac{83}{5}$ b) $5x - 3 > 50$ $x > \frac{53}{5}$ c) 11, 12, 13, 14, 15, 16
3	a) $5f$ represents the cost of 5 fish. 4 is the cost of 2 bags of chips. The total is less than 20 because Tom gets change from £20 b) $f < 3.2$ c) £3.19
4	a) $8x + 5 < 77$ $x < 9$ b) 8 years old
5	$80r + 250 < 1,000$ $r < \frac{75}{8}$ maximum of 9 rides
6	a) $15m + 800 > 2,000$ $m > 80$ kg b) 16 adults
7	ξ 
8	a) $4t + 100 < 1,000$ $t < 225$ m b) t must be greater than 0, as the field cannot have a negative or zero side.

Question	Answer
1	a) $m = 7$ b) $m > 7$ c) $m < 7$
2	$m > 8$
3	a) $p = 4$ b) $f = -1$ c) $r = -2$ d) $y = -6$
4	a) $x \leq 3$ b) $n \leq -8$ c) $g < -6$ d) $h < \frac{5}{2}$
5	a) On the scales, $5g$ weighs more than $12 + 2g$. b) The scales would balance.
6	$x = 3$ $x > 3$ The value in both solutions is 3 In the equation, x is equal to this value, but in the inequality x is greater than this value.
7	$b = 1$ Children can expand the brackets first, or divide through by 2, 3 or 6 first.
8	a) $w \geq 6$ b) $p > -1.5$

Answers

Question	Answer
1	a) $7x + 2 = 6x + 7$ $x = 5$ b) 37
2	a) $6x + 4 > 4x + 10$ $x > 3$ b) 33 cm^2
3	a) $x < 14$ b) $x > 14$ c) $x = 14$ d) They are both multiplying by 5 but then subtracting different numbers.
4	a) $22 + 1.5d > 10 + 4d$ $d < 4.8$ b) The solution to $22 + 1.5d = 10 + 4d$ is $d = 4.8$ This is not a whole number of days, so there is no number of days for which the companies charge the same.
5	a) $x < 2$ b) $x > 2$
6	No. Solving the equation for the angle sum of a triangle = 180° gives $x = 12$ So the angles of the triangles are 68° , 68° and 44° , which are all acute.
7	a) $x = 4.5$ Assumption: the triangle is isosceles, so the two base angles are equal. b) $-1, 0, 1, 2, 3, 4$

Question	Answer
1	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;"> $2x + 6$ </div> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;"> $x = 2x + 6$ </div> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;"> $T = 2x + 6$ </div> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;"> $2x + 6 \equiv 2(x + 3)$ </div> </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 20px;"> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">identity</div> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">equation</div> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">formula</div> <div style="border: 1px solid black; padding: 5px; width: 150px; text-align: center;">expression</div> </div> <p><i>(Note: Lines connect $2x + 6$ to identity and expression, $x = 2x + 6$ to equation, $T = 2x + 6$ to formula, and $2x + 6 \equiv 2(x + 3)$ to expression.)</i></p>
2	<p>a) $4(x - 2)$ $4x + 8$ $3x - 8 + x$ $4(x - 8)$</p> <p>b) multiple possible answers, e.g.: $2(x - 2) + 2(x - 2)$ $4x - 2 - 6$</p> <p>c) They are the same even if they look different. They can be simplified to the same expression.</p>
3	<p>a)</p>  <p style="text-align: center;">$A = \frac{1}{2}(a + b)h$</p> <p>b) $x = 5 \text{ cm}$</p>
4	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">$l \times w$</div> <div style="border: 1px solid blue; border-radius: 50%; padding: 2px;">$A = l \times w$</div> <div style="text-align: center;">πr^2</div> </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;"> <div style="border: 1px solid blue; border-radius: 50%; padding: 2px;">$A = \pi r^2$</div> <div style="text-align: center;">$\frac{b \times h}{2}$</div> <div style="border: 1px solid blue; border-radius: 50%; padding: 2px;">$A = \frac{b \times h}{2}$</div> </div> <p>They all have a single variable followed by an = sign then an expression in other variables.</p>

Question	Answer		
5	Expression	Equation	Formula
	$5 - 2s$ $3x + 2$	$4 - y = 1$ $3P + 5 = 16$	$A = 3T + 2$ $5 - 2R = N$
multiple possible answers, e.g.: $x + y$ $3a + 10 = 17$ $y = 5x - 30$ $3a - 100$ $4(x + 1) = 3x + 2$ $v = u + at$			

6	a) No. Eva's description could also apply to a formula. b) An equation has an equals and can be solved to find the value of a variable that makes the statement true.
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7	<p>The crossword puzzle contains the following words:</p> <ul style="list-style-type: none"> 1. EQUATION (vertical) 2. FORMULA (horizontal) 3. IDENTIFICATION (vertical) 4. LETTER (horizontal) 5. EXPRESSION (horizontal) 6. TABLET (vertical) 7. VARIABLE (horizontal)
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