

M8ALG4.1

## **Solving Unknown Variables**

| The Language of Algebra   |  |  |  |
|---|--|--|--|
| Algebra is a type of maths that uses variables to represent numbers.<br>In this unit, you will learn more algebraic terms and how to solve for<br>unknown variables within equations. |  |  |  |
| Variables   | Variables represent numbers or quantities.<br>The value they represent can <i>vary</i> .   |  |  |
|   | EXAMPLE: $x = 8$   |  |  |
| Equations   | Equations are made up of two expressions on either side<br>of an equal sign. These expressions do not have to have<br>the same number of terms (numbers or variables). |  |  |
|   | EXAMPLE:   |  |  |
|   | (3 terms) $2x + 1 = 7$ (1 term)  |  |  |
| Solve   | Solving an equation in algebra is to find the unknown value of a variable. This involves balancing.  |  |  |
|   | Balancing is the method of moving terms around.<br>We want to move all the terms that we know to one side<br>of the equals sign and isolate the unknown variable.      |  |  |
|   | To move a term across the equals sign,<br>We use the <b>opposite</b> math operation and<br>apply it to <b>both</b> sides of the equation.                              |  |  |
|   | <b>EXAMPLE</b> : Solve for x if $2x + 1 = 11$ .  |  |  |
|   | 2x + 1 = 11  |  |  |
|   | 2x + 1 - 1 = 11 - 1  |  |  |
|   | 2x = 10  |  |  |
|   | $2x \div 2 = 10 \div 2$  |  |  |
|   | x = 5  |  |  |



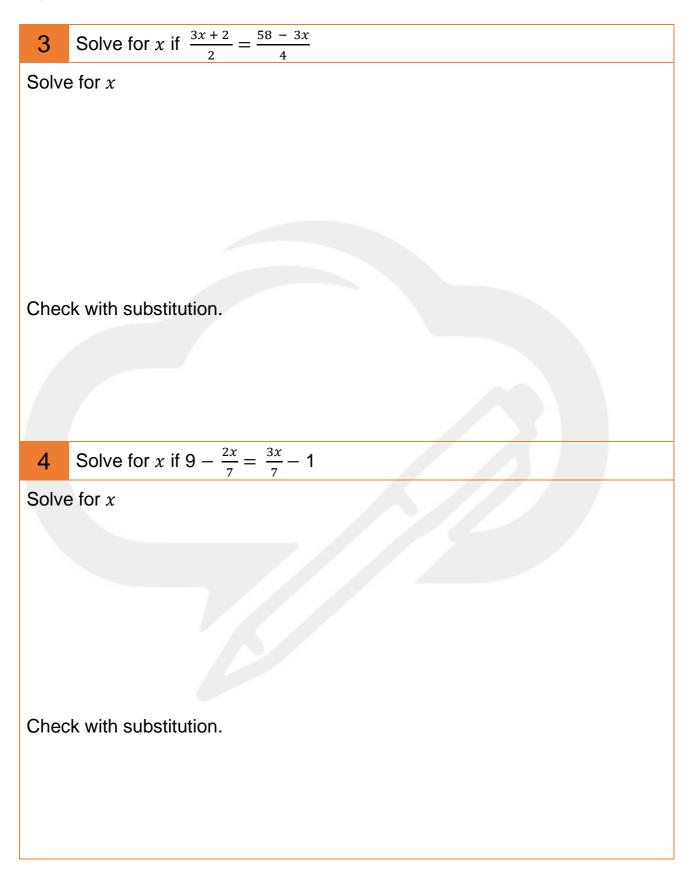


Instructions: Solve for the variables in the algebraic equations below.

| 1 Solve for x if $3(2 + \frac{4x}{5}) = 18$  |  |  |
|--|--|--|
| Solve for <i>x</i>                           |  |  |
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| Check with substitution.                     |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
| 2 Solve for x if $4x - 3 = \frac{7x + 1}{2}$ |  |  |
| Solve for <i>x</i>                           |  |  |
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| Check with substitution.                     |  |  |
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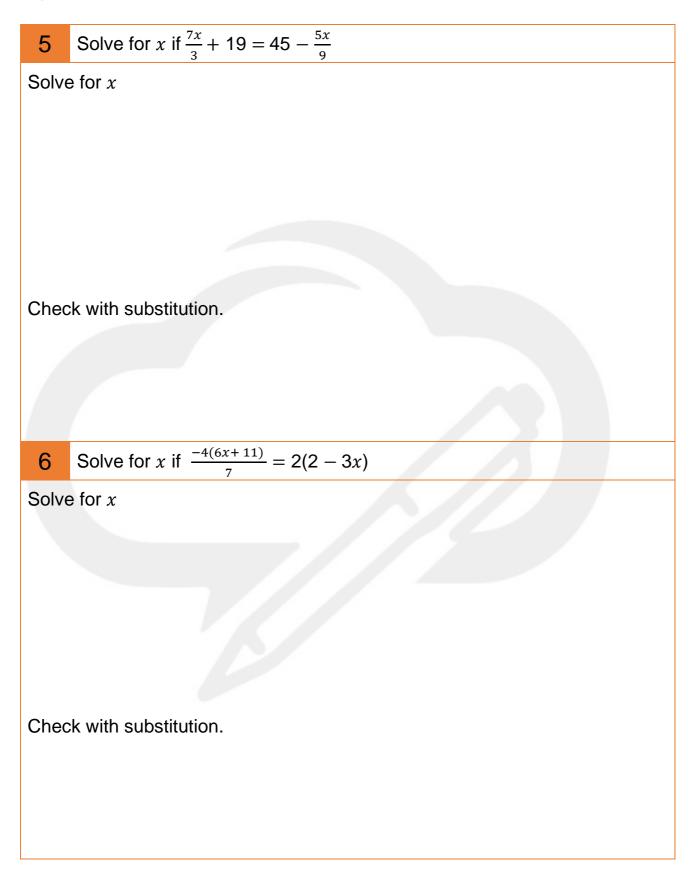






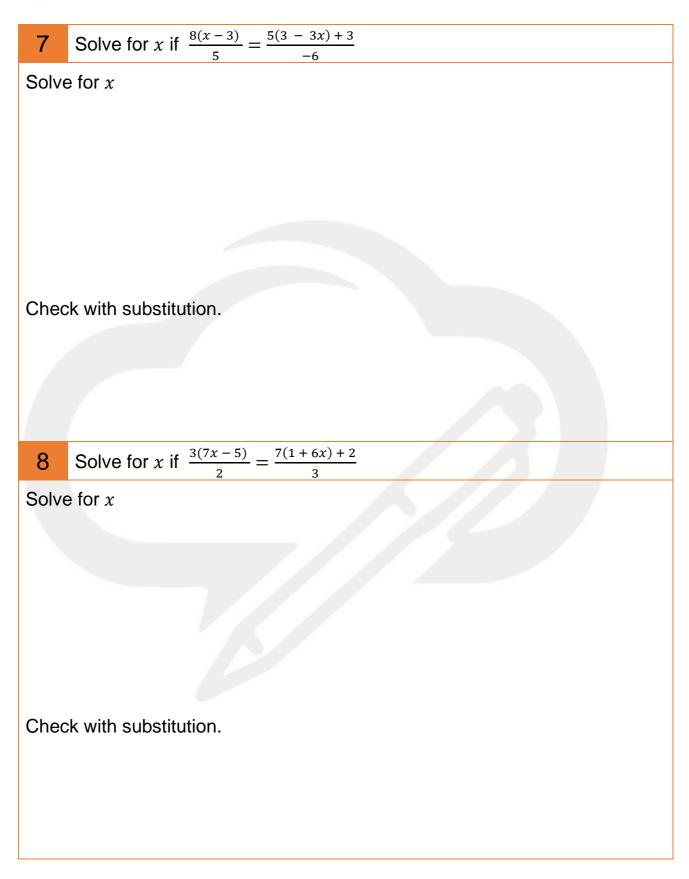














M8ALG4.2

## **Solving Unknown Variables**

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|---|--|--|--|
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| Variables   | Variables represent numbers or quantities.<br>The value they represent can <i>vary</i> .   |  |  |
|   | EXAMPLE: $x = 8$   |  |  |
| Equations   | Equations are made up of two expressions on either side<br>of an equal sign. These expressions do not have to have<br>the same number of terms (numbers or variables). |  |  |
|   | EXAMPLE:   |  |  |
|   | (3 terms) $2x + 1 = 7$ (1 term)  |  |  |
| Solve   | Solving an equation in algebra is to find the unknown value of a variable. This involves balancing.  |  |  |
|   | Balancing is the method of moving terms around.<br>We want to move all the terms that we know to one side<br>of the equals sign and isolate the unknown variable.      |  |  |
|   | To move a term across the equals sign,<br>We use the <b>opposite</b> math operation and<br>apply it to <b>both</b> sides of the equation.                              |  |  |
|   | <b>EXAMPLE</b> : Solve for x if $2x + 1 = 11$ .  |  |  |
|   | 2x + 1 = 11  |  |  |
|   | 2x + 1 - 1 = 11 - 1  |  |  |
|   | 2x = 10  |  |  |
|   | $2x \div 2 = 10 \div 2$  |  |  |
|   | x = 5  |  |  |



Instructions: Solve for the variables in the algebraic equations below.

| 1 Solve for x if $\frac{12(x+3)}{3} = -12$          |  |  |
|---|--|--|
| Solve for <i>x</i>                                  |  |  |
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|   |  |  |
| Check with substitution.                            |  |  |
|   |  |  |
|   |  |  |
|   |  |  |
| 2 Solve for x if $\frac{2(2x+1)}{3} = \frac{3x}{2}$ |  |  |
| Solve for x   |  |  |
|   |  |  |
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|   |  |  |
|   |  |  |
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|   |  |  |
| Check with substitution.                            |  |  |
| Check with substitution.                            |  |  |
| Check with substitution.                            |  |  |

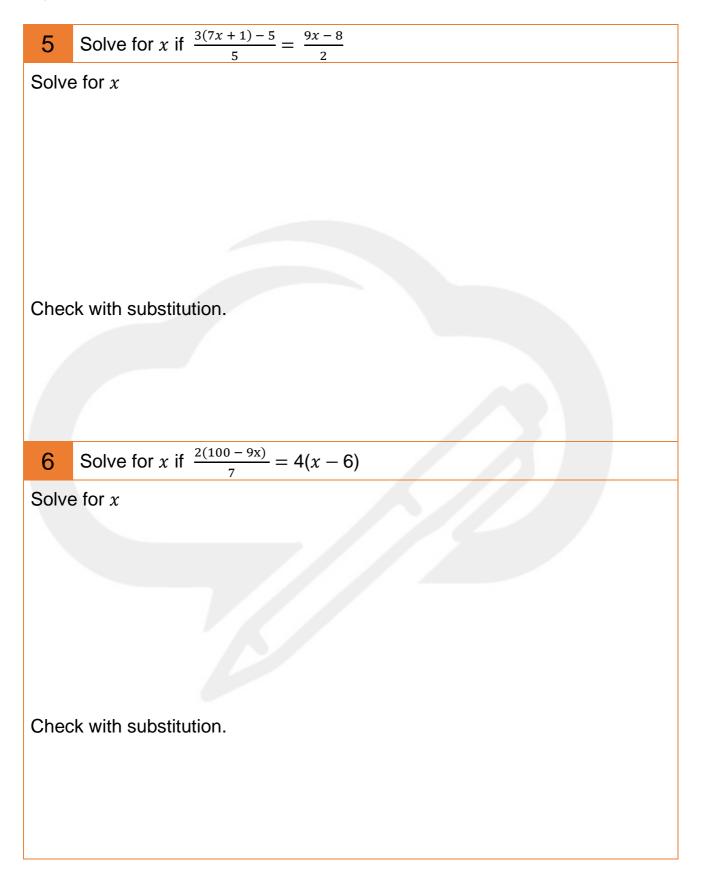




| 3 Solve for x if $\frac{7x}{4} + 2x = 2(2x - 1)$      |  |
|---|--|
| Solve for x   |  |
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|   |  |
| Check with substitution.                              |  |
|   |  |
|   |  |
|   |  |
| 4 Solve for x if $\frac{5x+12}{11} = \frac{4x-9}{15}$ |  |
| Solve for x   |  |
|   |  |
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|   |  |
|   |  |
| Check with substitution.                              |  |
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| 7                        | Solve for x if $\frac{2(x-1)}{(x-1)} = 4(2x-3) - 2(2x-1)$   |  |
|--------------------------|---|--|
| Solve                    | e for x   |  |
|                          |   |  |
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|                          |   |  |
| Chec                     | k with substitution.  |  |
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|                          |   |  |
|                          |   |  |
| 8                        | Solve for x if $\frac{5x-11}{(x+1)} = \frac{3(x+1)}{(x+1)}$ |  |
| Solve                    | e for x   |  |
|                          |   |  |
|                          |   |  |
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|                          |   |  |
| Check with substitution. |   |  |
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