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Like Terms
Translating statements
Solving 1- and 2-step linear equations
Tax and simple interest problems

Like Terms
Used in simplifying an expression (an algebraic expression).

Like: $3x, 5x$
They have the same variable, and the variable is to the same power (we doing the same thing to the variable in each case)
Add the two quantities together
The number in front of the variable is called the coefficient, and we add the coefficients
$$3x + 5x = (3 + 5)x = 8x$$

From the distributive property
$$a(b + c) = ab + ac$$

$$ba + ca = (b + c)a$$

Like: $-1.4t, 5.1t$
Add the terms: $-1.4t + 5.1t = (-1.4 + 5.1)t = 3.7t$

Unlike terms: $3x, 4y$
They are not alike because they have different variables

Unlike terms: $3x, 3x^2, \frac{3}{x}, 3\sqrt{x}$
The coefficients being the same doesn't matter. The variable is different. $x \neq x^2$, none of these are alike

Like: $3x^2, 4x^2$
Like: 5, 8

Example. Simplify the expression by adding like terms.

$$\textcolor{red}{2.1r} + \textcolor{green}{3.2t} - 4t^2 + \textcolor{blue}{11} - \textcolor{red}{1.6r} + \textcolor{green}{8.1t} + 2r^2 - \textcolor{blue}{6}$$

$$(2.1r - 1.6r) + (3.2t + 8.1t) + (11 - 6) - 4t^2 + 2r^2$$

$$0.5r + 11.3t + 5 - 4t^2 + 2r^2$$

Simplifying an expression and solving an equation.
Simplifying is a kind of reduction. You are making the expression less complicated. Canceling when you can. Combining like terms.
Solving: you need an equal sign. There are things you can do when you have an equation that you can't do when you don't have an equation.

Translating English statements into algebraic statements

Addition:

English	Algebra
A number plus three	$n + 3$
Three more than a number	$n + 3$
The sum of a number and three	$n + 3$
The total of a number and three	$n + 3$
A number increased by three	$n + 3$
A number added to three	$n + 3$
A number minus three	$n - 3$
Three less than a number	$n - 3$
The difference of a number and three	$n - 3$
A number decreased by three	$n - 3$
Three subtracted from a number	$n - 3$
Three times a number	$3n$
The product of three and number	$3n$
Twice a number	$2n$
A number multiplied by three	$3n$
One third of a number	$\dfrac{1}{3}n$
A number divided by three	$\dfrac{n}{3}$
The quotient of a number and three	$\dfrac{n}{3}$
A number divided into three	$\dfrac{3}{n}$
The ratio of a number and three	$\dfrac{n}{3}$
A number squared	n^2
The square root of a number	$\sqrt{n}$
The reciprocal of a number	$\dfrac{1}{n}$
Seven less than a number is equal to ten. Seven less than a number equals ten.	$x - 7 = 10$
Three times a number is six.	$3x = 6$
Eight is the same as twice a number.	$8 = 2x$
A number increased by two yields five.	$x + 2 = 5$
Nine less than a number amounts to twenty.	$x - 9 = 20$
Six and number totals eleven.	$6 + x = 11$

Five times the sum of x and y.
$$5(x + y)$$

Five times x and y or Five times one number added to a second number or The sum of five times x and y
$$5x + y$$

Three times the difference of a number and six

$$3(x - 6)$$

Twice a number and four vs. Twice the sum of a number and four

$$2x + 4 \ \ vs. \ \ 2(x + 4)$$

Six times the difference of a number and eight gives twenty-two.

$$6(t - 8) = 22$$

Solving 1- and 2-step algebra problems

Properties of equality.
Addition Property of equality, and the multiplication property of equality.

Addition property of equality:
If $a = b$, the equation is still true if I add (or subtract) the same value to both sides: $a + c = b + c$

Multiplication property of equality:
If $a = b$, then the equation is still true if I multiply (or divide) by the same value to both sides (not zero): $ac = bc$

Solving equations with the addition property:

$$x + 3 = 7$$
$$x + 3 - 3 = 7 - 3$$
$$x = 4$$

$$x - 5 = 11$$
$$x - 5 + 5 = 11 + 5$$
$$x = 16$$

Solving equations with multiplication property:

$$3x = 6$$

$$\frac{3x}{3} = \frac{6}{3}$$

$$x = 2$$

$$\frac{3}{4}x = 36$$

$$\left(\frac{4}{3}\right)\left(\frac{3}{4}x\right) = \left(\frac{4}{3}\right)\left(\frac{36}{1}\right)$$

$$x = 48$$

2-step equations where we use both properties.
The term with x by itself first. Then solve for x.

$$3x + 4 = 10$$

Get rid of the constant to get 3x by itself. Add (-4) to both sides.

$$3x + 4 - 4 = 10 - 4$$
$$3x = 6$$

Divide out the coefficient of x.

$$\frac{3x}{3} = \frac{6}{3}$$

$$x = 2$$

Check answer:

$$3(2) + 4 =? 6 + 4 = 10$$

Percent increase/decrease problems

$$original\ value + \%inc\_or\_dec\ = new\ value$$

$$original\ value + (orginal\ value * percentage) = new\ value$$

If the original value is unknown, replace it with x.

$$x + x(p\%) = new\ value$$

$$(1 + p\%)x = new\ value$$

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$$(1 + 0.07)x = 187.25$$
$$(1.07)x = 187.25$$

$$\frac{1.07x}{1.07} = \frac{187.25}{1.07}$$

$$x = 175$$

The price of the book(s) on the shelf was $175.00.