Formulas! They are everywhere; how fast is an athlete runner? I don't know, but $r = \frac{d}{t}$, so if we know how long it takes for a runner to run a given distance, we can calculate the runner's speed.

Vocabulary:

Formula – is an equation that states a rule for a relationship among quantities. Note these quantities take on the role of the variables in the formula.

Literal equation – an equation has two or more variables is called a **literal equation**. You can assume that pretty much all formulas are literal equations.

So, how do we go about solving a formula for a specific variable? It is a simple *(really!!)* 3 step process:

1. Locate the variable you need to solve for in the equation.
2. Figure out what operations are being done on the variable and the order in which they are applied
3. Use inverse operations to undo the existing operations in the equation so to isolate the variable.

It is not that bad. Actually it is what we have been doing this entire chapter. We are now going to specifically apply our equation solving techniques to fancy formulas!

The formula for a Fahrenheit temperature in terms of degrees Celsius is $F = \frac{9}{5}C + 32$. What is the formula for a Celsius temperature in terms of degrees Fahrenheit? *(solve for C)*

$F = \frac{9}{5}\boxed{C} + 32.$

$F - 32 = \frac{9}{5}C + 32 - 32$

$\frac{5}{9}(F - 32) = \left(\frac{5}{9}\right)\left(\frac{9}{5}C\right)$

$\therefore C = \frac{5}{9}(F - 32)$

Follow the process:

1. Where is my variable?
2. We are adding 32 and C has a coefficient.
3. Use subtraction to get the "C term" by itself then multiply by the reciprocal to get rid of the $\frac{9}{5}$

You try:

The formula for an objects final velocity f is $f = i - gt$ where I is the object's initial velocity, g is acceleration due to gravity, and t is time. Solve for i.	Solve: $5 - b = 2t \quad for\, t.$