

## Equations — 1.1

Homework:  
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### Expressions

Simplify expressions to another form; the value of the expression doesn't change. There is no equal sign in an expression.

Examples:

$$2x + 3 + 5 \rightarrow 2x + 8 \qquad \frac{25}{15} \rightarrow \frac{5}{3}$$

### Equations

Solve equations to find the value(s) of the variable(s) which make the equation true. Solve equations by “undoing what happens to the variable”. You can always check your solution by substituting the value back into the equation.

There are three types of equations:

- An **identity** is an equation that is always true. If an equation is an identity, all real numbers ( $\mathbb{R}$ ) are solutions.
- A **contradiction** is an equation that doesn't have a solution.
- A **conditional** equation is an equation that has a certain number of solutions.

### Linear Equations

Linear equations (once simplified) contain a variable(s) that is only to the first power. To solve a linear equation by adding, subtracting, multiplying and dividing to isolate the variable(s).

*Solve.*

1.  $(2x + 9)(4x - 3) = 8x^2 - 12$

2.  $(x - 1)^3 = (x + 1)^3 - 6x^2$

### Equations with Fractional Expressions

An equation with fractional expressions contains one or more fractional expressions. To solve this type of equation, it is easiest to “get rid of the denominators” by multiplying each term in the equation by the least common denominator (LCD), and then to continue by solving the remaining equation.

**Always check for extraneous solutions!**

*Solve.*

3.  $\frac{2x}{2x + 3} + \frac{6}{4x + 6} = 5$

$$4. \frac{2}{2x+5} + \frac{3}{2x-5} = \frac{10x+5}{4x^2-25}$$

### **Literal Equations**

A literal equation contains one or more letters or symbols (usually it is a formula). You will be asked to solve the literal equation for a specific value. Do this by treating all other values as constants (known values). If the equation cannot be solved by simply adding, subtracting, multiplying and/or dividing, don't forget that you can FACTOR!

*Solve for the specified variable.*

$$5. A = P + Prt \quad \text{for } r$$

$$6. \beta = \frac{1 + \alpha}{\alpha} \quad \text{for } \alpha$$

$$7. S = 2(lw + hw + hl) \quad \text{for } h$$