

How Variables Work

I. Addition (when the variables are the same and have the same exponent):

$$x + x?$$

This is the same as $1x + 1x$ (the ones are “understood”). Treat this like an ordinary addition problem;

$$1x + 1x = 2x$$

Other examples:

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

$$6y + 94y = 100y$$

II. Subtraction (when the variables are the same and have the same exponent):

$$x - x?$$

This is the same as $1x - 1x$ (the ones are “understood”). Treat this like an ordinary subtraction problem.

$$1x - 1x = 0x = 0$$

Other examples:

$$6x - 4x = 2x$$

$$4x - 6x = -2x$$

$$-4x - 12x = -16x$$

III. Multiplication / Division by constants:

$$3 \bullet x?$$

This is the same as $\frac{3}{1} \bullet \frac{x}{1}$, so treat it as multiplication of two fractions.

$$\frac{3}{1} \bullet \frac{x}{1} = \frac{3x}{1} \text{ or } 3x$$

Other examples:

$$\frac{1}{2} \bullet x = \frac{1}{2} \bullet \frac{x}{1} = \frac{x}{2} \text{ or } \frac{1}{2}x$$

$$x \div 3 = \frac{x}{1} \div \frac{3}{1} = \frac{x}{1} \bullet \frac{1}{3} = \frac{x}{3} \text{ or } \frac{1}{3}x$$