

Finding the variable in

$$\frac{2}{x} + 3 = \frac{1}{x}$$

We'll make sure to do the same things to both sides to keep the equal sign/balance.

$$3 = \frac{1}{x} - \frac{2}{x}$$

Let's gather the terms with the x's to one side by subtracting  $\frac{2}{x}$ . Since the fractions have a common denominator we can perform the fraction subtraction.

$$3 = \frac{1-2}{x} \quad \text{or} \quad 3 = \frac{-1}{x}$$

If we convert the fraction to division  $3 = (-1) \div x$  we could convert this into a multiplication problem:  $3 \times x = (-1)$  or  $3x = -1$ .

Dividing both sides by 3 gives us  $x = -\frac{1}{3}$

Let's work on the left side and simplify. Perhaps we can perform the addition. Since  $\frac{2}{x}$  is a fraction we can treat 3 as  $\frac{3}{1}$ , so we are adding fractions?

Let's get a common denominator:  $\frac{2}{x} + \frac{3}{1} = \frac{2}{x} + \frac{3x}{x} = \frac{2+3x}{x}$

So we have  $\frac{2}{x} + 3 = \frac{1}{x}$  is  $\frac{2+3x}{x} = \frac{1}{x}$ .

Notice we have a common den. for our fraction on the left and fraction on the right? The equality would happen when the two numerators were equal so  $2+3x=1$ .

Subtracting 2 from both sides  $3x = -1$

Dividing both sides by 3 to maintain equality/balance  $\Rightarrow x = -\frac{1}{3}$