

Applications of Translating to Equations

REMEMBER that an equation is an equality of two mathematical expressions. This means that somewhere in the sentences there will be two different ways of saying the same thing.

EXAMPLE: The selling price of a television set is \$520. This is \$20 more than twice the cost of a certain V.C.R. Find the price of the V.C.R.

First of all determine what it is that you want to find. Whenever possible let the thing you are trying to find be the variable. In this problem we want to find the price of the V.C.R., so we will let x be the price of the V.C.R.

Now we will try to find two equivalent statements which will allow us to use the variable. One statement is “the price of a television set is \$520.”

The other statement says, “this (meaning the price of the TV set) is \$20 more than twice the price of the V.C.R.”

We now have 2 different ways of describing the price of the TV. Our equation will be:

$$\begin{array}{rcl}
 \boxed{\text{The Price of the TV}} & = & \boxed{\text{The Price of the TV}} \\
 520 & = & 2(\text{VCR}) + 20 \\
 520 & = & 2x + 20
 \end{array}$$

SOLVE:

$$\begin{array}{r}
 520 = 2x + 20 \\
 -20 + 520 = 2x + 20 + (-20) \\
 500 = 2x \\
 \frac{1}{2} \cdot 500 = \frac{1}{2} \cdot 2x \\
 \frac{500}{2} = x \\
 250 = x
 \end{array}$$

CHECK:

$$\begin{array}{r}
 520 = 2(250) + 20 \\
 520 = 500 + 20 \\
 520 = 520 \quad \text{TRUE}
 \end{array}$$

The price of the V.C.R. is \$250.

EXAMPLE: A recipe calls for a total of 24 ounces of sugar, flour and bran. There is twice as much flour as sugar and three times as much bran as sugar. Find the number of ounces of each ingredient.

It is a bit more difficult to decide what your variable should represent in this problem. We will determine our equation first and then decide. **REMEMBER** that we must find two different ways of saying the same thing.

A recipe calls for 24 ounces of sugar, flour and bran.

There is twice as much flour as sugar and three times as much bran as sugar.

Our equation will be:

$$\boxed{\text{Amount of sugar, flour, bran}} = \boxed{\text{Amount of sugar, flour, bran}}$$

One way to say this is 24 ounces. Now we need a way to describe the number of ounces of sugar, flour and bran using only one variable.

We will look to see if we can find the relationship between the amounts of the three ingredients.

$$\text{Amount of Flour} = 2 \cdot (\text{amount of sugar})$$

$$\text{Amount of Bran} = 3 \cdot (\text{amount of sugar})$$

Both the amount of flour **and** the amount of bran are described using sugar. We will let the amount of sugar be x . Sugar = x

$$\text{Flour} = 2(\text{sugar}) = 2x$$

$$\text{Bran} = 3(\text{sugar}) = 3x$$

Amount of sugar, flour, bran	=	Amount of sugar, flour, bran
24	=	$x + 2x + 3x$

SOLVE:

$$24 = 6x$$

$$\frac{1}{6} \cdot 24 = \frac{1}{6} \cdot 6x$$

$$4 = x$$

$$x = \text{number of ounces of sugar} = 4 \text{ oz.}$$

$$2x = \text{number of ounces of flour} = 2(4) = 8 \text{ oz.}$$

$$3x = \text{number of ounces of bran} = 3(4) = 12 \text{ oz.}$$

$$\mathbf{4 + 8 + 12 = 24}$$

Do not forget UNITS!

REMEMBER that whenever you have two or more unknown quantities there will be some relationship between them which will allow you to write an expression for each one using a single variable.