



1.  $4/7 + 3/4 =$

2.  $8 \frac{5}{6} + 2 \frac{2}{9} =$

3.  $5/6 - 3/5 =$

4.  $4 \frac{11}{16} - 2 \frac{3}{8} =$

5.  $5/6 \times 3/5 =$

6.  $2/9 \times 2/3 =$

7.  $1/12 \div 7/9 =$

8.  $3/7 \div 3/5 =$

9. Change  $1/6$  to a decimal

10. Change  $.625$  to a fraction

11.  $4.9 + 17 \frac{3}{28} =$

12.  $13 - .932 =$

13.  $73.8 \times .06 =$

14.  $3237 \div .039 =$

15.  $8.1 \div .003 =$

16. Change 12% to a fraction

17. \_\_\_\_\_ is 80 % of 500?

18. 14 is \_\_\_\_\_ % of 35?

19. 75% of \_\_\_\_\_ is 48?

20. \_\_\_\_\_ is 10% of 17

21. 17 is \_\_\_\_\_ % of 85

22. 25 % of \_\_\_\_\_ is 10

23.  $3^3 =$

24.  $4^2 \times 5 =$

25.  $\sqrt{64} =$

26.  $\sqrt{(3)} =$

27.  $2/3 = ?/15$

28.  $14/? = 28/12$

29.  $-21 + 9 =$

30.  $-5 + 2 =$

31.  $24 \times -3 =$

32.  $-66 \div -3 =$

33.  $-12 \div -15 =$

34.  $6 \times -7 =$

35.  $24 \div -6 =$

36.  $-13 - -4 =$

37. Solve  $x + 2y - 4$  if  $x=3, y=4$

38. Solve  $2(3x-y) + 4y$  if:  $x = 5, y = 2$

39. Solve for  $x$   $2(x-3) = 10$

40. Solve for  $x$   $4x-3=13$

# Answer Key

1.  $\frac{4}{7} + \frac{3}{4} = 1\frac{9}{28}$

2.  $8\frac{5}{6} + 2\frac{2}{9} = 11\frac{1}{18}$

3.  $\frac{5}{6} - \frac{3}{5} = \frac{7}{30}$

4.  $4\frac{11}{16} - 2\frac{3}{8} = 2\frac{5}{16}$

5.  $\frac{5}{6} \times \frac{3}{5} = \frac{1}{2}$

6.  $\frac{2}{9} \times \frac{2}{3} = \frac{4}{27}$

7.  $\frac{1}{12} \div \frac{7}{9} = \frac{3}{28}$

8.  $\frac{3}{7} \div \frac{3}{5} = \frac{5}{7}$

9. Change  $\frac{1}{6}$  to a decimal .1666

10. Change .625 to a fraction  $\frac{5}{8}$

11.  $4.9 + 17 + 3.28 = 25.18$

12.  $13 - .932 = 12.068$

13.  $73.8 \times .06 = 4.428$

14.  $3237 \div .039 = 83,000$

15.  $8.1 \div .003 = 2,700$

16. Change 12% to a fraction  $\frac{3}{25}$

17. 400 is 80% of 500?

18. 14 is 40 % of 35?

19. 75% of 64 is 48?

20. 1.7 is 10% of 17

21. 17 is 20 % of 85

22. 25% of 40 is 10

23.  $3^3 = 27$

24.  $4^2 \times 5 = 80$

25.  $\sqrt{64} = 8$

26.  $\sqrt{9} = 3$

27.  $\frac{2}{3} = \frac{10}{15}$

28.  $\frac{14}{6} = \frac{28}{12}$

29.  $-21 + 9 = -12$

30.  $-5 + 2 = -3$

31.  $24 \times (-3) = -72$

32.  $-66 \div (-3) = 22$

33.  $-12 \div -15 = .8$

34.  $6 \times -7 = -42$

35.  $24 \div -6 = -4$

36.  $-13 - (-4) = -9$

37. Solve  $x + 2y - 4$  If:  $x = 3, y = 4$  **7**

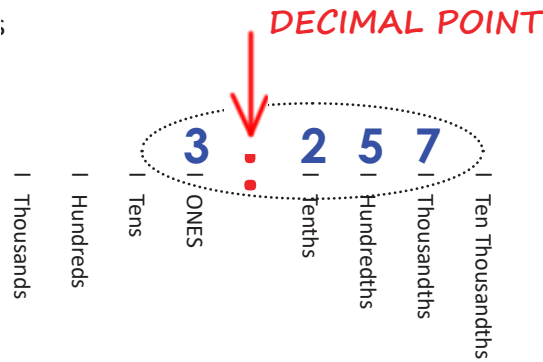
38. Solve  $2(3x - y) + 4y$  If:  $x = 5, y = 2$  **34**

39. Solve for x  $2(x - 3) = 10$  **8**

40. Solve for x  $4x - 3 = 13$  **4**



A decimal is a number that represents **PART** of a whole. Decimals are another way of writing fractions that have denominators that are powers of ten.



## ADDING & SUBTRACTING DECIMALS

When **ADDING** or **SUBTRACTING** decimals, . . Rewrite the problem in column form. Then just line up the decimals, add any zeros if necessary, and just add or subtract as you would with whole numbers. Place the decimal for the answer directly below the decimals in the problem.

Line up the decimal points...

$$\begin{array}{r} 3.21 \\ + 4.50 \\ \hline 7.71 \end{array}$$

and just drag that decimal point straight down!

**Add as usual!**

## MULTIPLYING DECIMALS

When **MULTIPLYING** decimals, . . Rewrite the problem in column form. Ignore the decimal and multiply as you would with whole numbers. Count the number of decimal places (on the right side of the decimal) in each number. The total tells you how many decimal places will be in the answer.

$$\begin{array}{r} 2.35 \\ \times 7.8 \\ \hline 1880 \\ +1645 \\ \hline 18330 \end{array}$$

↑↑     ↑

①②     ③

18330

③②①

So,  $2.35 \times 7.8 = 18.33$

## DIVIDING DECIMALS

When **DIVIDING** decimals with a whole number it works exactly like regular long division, . . with just one difference. Start by rewriting the problem using the long division format.

Problem:  $2.35 \div 5 =$

And put the decimal point right above the other one.

$$5 \overline{) 2.35}$$

$$\begin{array}{r} 5 \overline{) 2.35} \\ - 20 \\ \hline 35 \\ - 35 \\ \hline 0 \end{array} \rightarrow \begin{array}{r} 5 \overline{) 2.35} \\ - 20 \\ \hline 35 \\ - 35 \\ \hline 0 \end{array}$$

So,  $2.35 \div 5 = .47$

When **DIVIDING decimals with a decimal** it works exactly like regular long division. . . Start by rewriting the problem using the long division format.

**Problem:**  $6.85 \div .5 =$

Move the decimals to the right on both numbers until you are dividing by a whole number.

$$\begin{array}{r} .5 \overline{) 6.85} \\ \rightarrow 5 \overline{) 68.5} \end{array}$$

don't need



Then divide as you normally would.

$$\begin{array}{r} 1 \overline{) 68.5} \\ -5 \phantom{0} \\ \hline 18 \phantom{0} \\ -15 \phantom{0} \\ \hline 3 \phantom{0} \end{array}$$

$$\begin{array}{r} 13 \overline{) 68.5} \\ -5 \phantom{0} \\ \hline 18 \phantom{0} \\ -15 \phantom{0} \\ \hline 3 \phantom{0} \end{array}$$

$$\begin{array}{r} 13.7 \overline{) 68.5} \\ -5 \phantom{0} \\ \hline 18 \phantom{0} \\ -15 \phantom{0} \\ \hline 35 \phantom{0} \\ -35 \phantom{0} \\ \hline 0 \end{array}$$

So,  $6.85 \div .5 = 13.7$

Remember, you can check your answer by multiplying

$13.7 \times 5 = 68.5$

## Order of Operations



“Operations” means things like add, subtract, multiply, divide, squaring, etc. If it isn’t a number it is probably an operation.

But, when you see something like. . .

$$7 + (6 \times 5^2 + 3)$$

. . . what part should you calculate first?

Start on the left and go to the right?

Or go from right to left?

Warning: Calculate them in the wrong order and you will get a wrong answer!

**All you have to remember. . . PEMDAS**

(Please Excuse My Dear Aunt Sally)

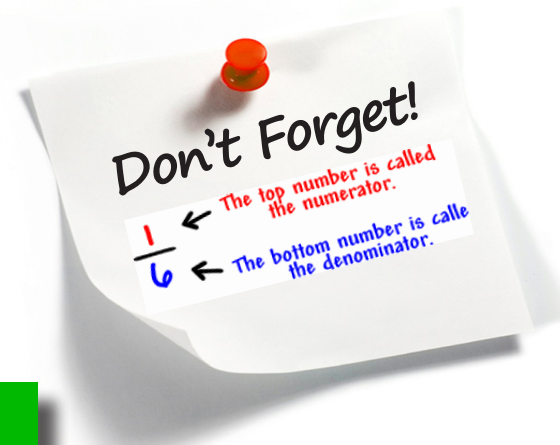
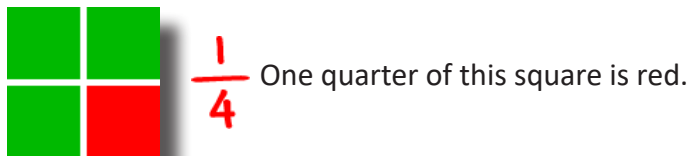
1st	2nd	3rd	4th
<b>P</b>	<b>E</b>	<b>M D</b>	<b>A S</b>
Parenthesis	Exponents	Multiply or Divide	Add or subtract
( )	$X^2$	<b>x or /</b>	<b>+ or -</b>
		→ From left to right	→ From left to right

$6 \times (5 + 3) = 30 + 3 = 33$  ❌

Problem:  $6 \times (5 + 3) = 6 \times 8 = 48$  ✅

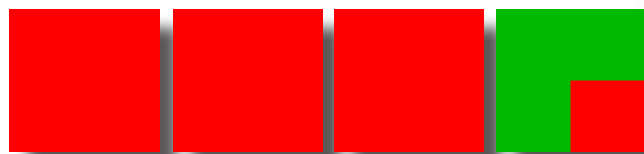
# MATH REFRESHER FRACTIONS

Fractions are for counting PART of something.



Mixed numbers are used when you need to count whole things **AND** parts of things at the same time.

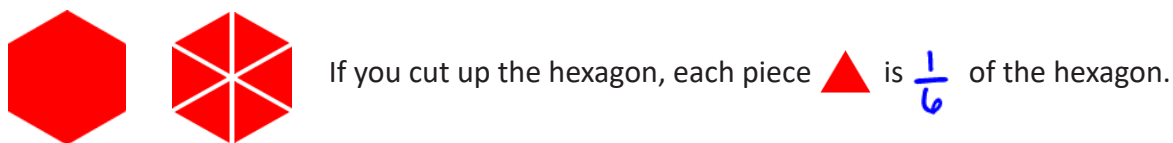
How much of these squares are red?










There are **3** whole squares and  $\frac{1}{4}$  of another square...

We write it like this:  $3\frac{1}{4}$  and read it like "three and one fourth."

## ADDING & SUBTRACTING FRACTIONS WITH **SAME** DENOMINATORS



And pieces  is  $\frac{4}{6}$  of the hexagon.

So, what would  +  =      =  $\frac{5}{6}$  OR  $\frac{1}{6} + \frac{4}{6} = \frac{5}{6}$

We can only do this when the denominators are the same!

## ADDING & SUBTRACTING FRACTIONS WITH **DIFFERENT** DENOMINATORS

$$\frac{1}{2} + \frac{1}{3} \longrightarrow \frac{1 \times 3}{2 \times 3} = \frac{3}{6} \longrightarrow \frac{3+2}{6} = \frac{5}{6}$$

The main rule of this game is that we can't do anything until the denominators are the same!

We need to find something called the Lowest Common Denominator (LCD)... It's really just the Lowest Common Multiplier (LCM) of our denominators, **2** and **3**.

The LCM of **2** and **3** is **6**. So, our LCD **6**. We need to make this our new denominator...

## MULTIPLYING FRACTIONS

To multiply fractions, you need to multiply all the numerators together, and then multiply all the denominators. However, if you have **mixed numbers** to multiply, you must first convert them into an **improper fraction** and then multiply these fractions.

$$\frac{1}{5} \times \frac{2}{3} \Rightarrow \frac{1 \times 2}{5 \times 3} = \frac{2}{15}$$

$$\begin{array}{l} \text{Mixed Number} \quad \rightarrow \quad 5\frac{2}{3} \times \frac{1}{4} = \frac{17}{3} \times \frac{1}{4} \\ \text{Improper Fraction} \end{array}$$

$$\frac{17}{3} \times \frac{1}{4} = \frac{17}{12} = 1\frac{5}{12}$$

## DIVIDING FRACTIONS

To divide fractions, you flip or invert the fraction that you are dividing by and then proceed to multiply the fractions as explained previously.

Problem:  $\frac{1}{3} \div \frac{3}{4} \rightarrow \frac{1}{3} \div \frac{3}{4} = \frac{1}{3} \times \frac{4}{3} = \frac{4}{9}$

Problem:  $\frac{5}{7} \div \frac{10}{15} \rightarrow \frac{5}{7} \div \frac{10}{15} = \frac{5}{7} \times \frac{15}{10} = \frac{5}{7} \times \frac{15}{10} = \frac{1 \times 15}{7 \times 2} = \frac{15}{14} = 1\frac{1}{14}$

Simplify by cross-canceling and reducing

## CONVERTING DECIMALS TO FRACTIONS

Remove the decimal point and make the decimal number the numerator.

Problem: Convert .5 to a fraction  $.5 = \frac{5}{10}$

$$.5 = \frac{5}{10} = \frac{5}{10} \div \frac{5}{5} = \frac{1}{2} \rightarrow .5 = \frac{1}{2}$$

—	Thousands
—	Hundredths
—	Tenths
—	ONES
—	Tens
—	Hundreds

Here is another example...  $.26 \rightarrow .26 = \frac{26}{100} = \frac{26}{100} \div \frac{2}{2} = \frac{13}{50}$

Look at the last spot... It's the hundredths ( $\frac{1}{100}$ )

Reduce it!

Here is another example...

$$.325 = \frac{325}{1000} = \frac{325}{1000} \div \frac{25}{25} = \frac{13}{40}$$

Reduce it!

## CONVERTING FRACTIONS TO DECIMALS

Fractions and decimals represent the same things: numbers that are not whole numbers. Just divide the top of the fraction (*Numerator*) by the bottom (*Denominator*), and read off the answer!

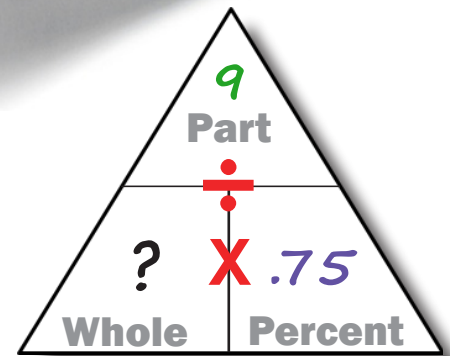
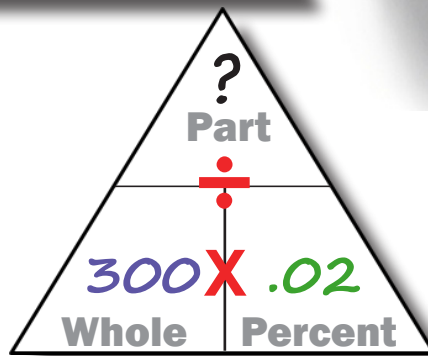
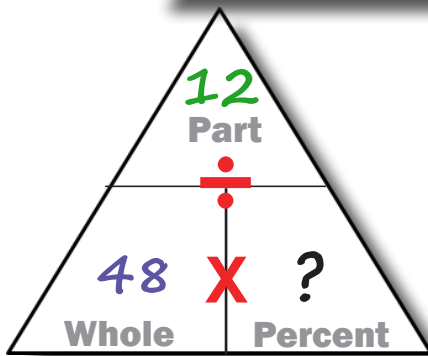
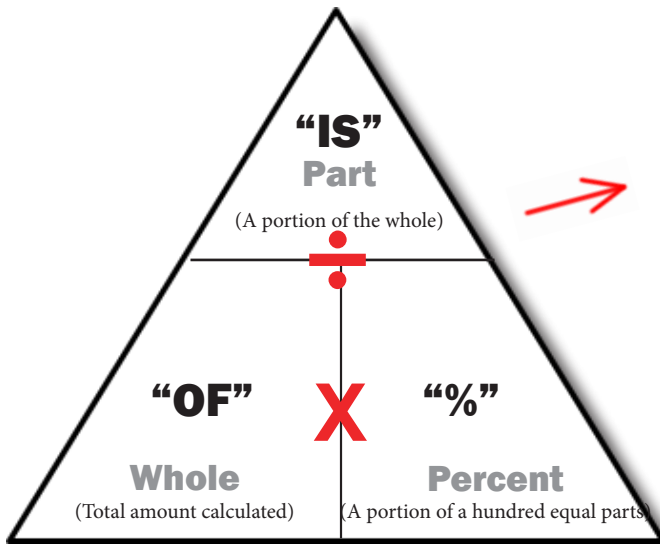
$$\frac{1}{3} \rightarrow 3 \overline{)1} \rightarrow 3 \overline{)1.0} \rightarrow 3 \overline{)1.00} \rightarrow 3 \overline{)1.000}$$

$$\begin{array}{r} 3 \overline{)1.0} \\ \underline{-9} \\ 1 \end{array} \quad \begin{array}{r} 3 \overline{)1.00} \\ \underline{-9} \\ 10 \\ \underline{-9} \\ 1 \end{array} \quad \begin{array}{r} 3 \overline{)1.000} \\ \underline{-9} \\ 10 \\ \underline{-9} \\ 10 \\ \underline{-9} \\ 1 \end{array}$$

# MATH REFRESHER PERCENTS

Percent problems are **ALWAYS** made up of three numbers: Part, Whole and Percent. You will **ALWAYS** have two of these three numbers. To solve a percent problem, you simply solve for the missing number.

The first thing you have to do is determine what you have and what is missing.



**Problem:**  
 12 is what percent of 48?  
 Part = 12  
 Whole = 48  
 Percent = ?

Part ÷ Whole = Percent  
 $12 \div 48 = ?$   
 $12 \div 48 = 25\% (.25)$

**Problem:**  
 2% of 300 = ?  
 Part = ?  
 Whole = 300  
 Percent = 2% (.02)

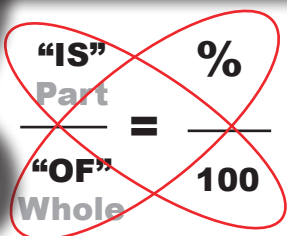
Percent X Whole = Part  
 $.02 \times 300 = ?$   
 $.02 \times 300 = 6$

**Problem:**  
 75% of ? = 9  
 Part = 9  
 Whole = ?  
 Percent = 75% (.75)

Part ÷ Percent = Whole  
 $9 \div .75 = ?$   
 $9 \div .75 = 12$



## Diane's Tip



~~$\frac{12}{48} = \frac{x}{100} = \frac{1200}{48}$~~

$48 \overline{) 1200}$   
 $\underline{96}$   
 $24$

X = 25



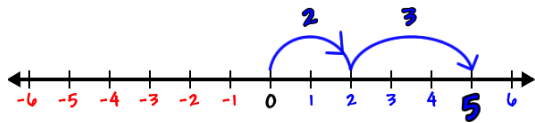
**Cross Multiply**  
**THEN Divide!**



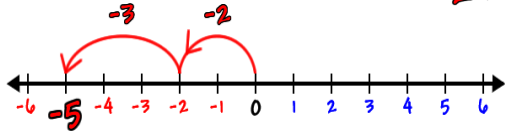
# MATH REFRESHER SIGNED NUMBERS

## ADDING RULES:

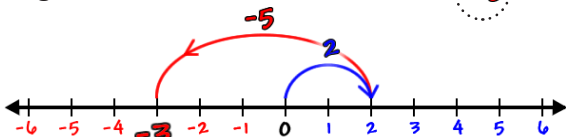
Positive + Positive = Positive  $2 + 3 = 5$



Negative + Negative = Negative  $-2 + -3 = -5$

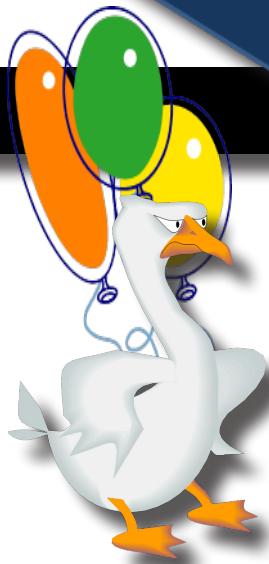


Positive + Negative = Use the sign of the larger number and subtract.  $2 + -5 = -3$



Another way  
of looking at

**Positive & Negative**  
numbers



*Have you ever been to a party like this?*

## MULTIPLYING and DIVIDING ONLY!!

Everyone is happy and having a good time (they are all POSITIVE). Suddenly, who should appear but the GROUCH (one NEGATIVE)! The grouch goes around complaining to everyone about the food, the music, the room temperature, the other people. . .What happens to the party? Everyone feels a lot less happy. . .The party isn't fun anymore.

## ONE NEGATIVE MAKES EVERYTHING NEGATIVE

But wait. . .is that another guest arriving? What if another grouch (A SECOND NEGATIVE) appears? The two negatives pair up and gripe and moan to each other about what a horrible party it is and how miserable they are!! But look!!! They are starting to smile; they're beginning to have a good time, themselves!!

## PAIRS OF NEGATIVES BECOME POSITIVE

Now that the two grouches are together the rest of the people (who were really positive all along) become happy once again. The party is saved!!

The moral of the story is that (at least in math, when *multiplying or dividing*) the number of positives don't matter, but watch out for those negatives!!

To determine whether the outcome will be positive or negative, count the number of negatives; If there are an even number of negatives-- and you can put them in pairs--the answer will be positive, if not. . .it'll be negative:

**Negatives in PAIRS ARE POSITIVE;**  
**NOT in pairs, they're NEGATIVE.**

## SUBTRACTING RULES:

Negative - Positive = Negative:

$$(-5) - = -5 + (-3) = -8$$

Positive - Negative = Positive + Positive = Positive:

$$5 - (-3) = 5 + 3 = 8$$

Negative - Negative = Negative + Positive = Use the sign of the larger number and subtract (Change double negatives to a positive)

$$(-5) - (-3) = (-5) + 3 = -2$$

## MULTIPLYING RULES:

Positive X Positive = Positive:  $3 \times 2 = 6$

Negative X Negative = Positive:  $(-2) \times (-8) = 16$

Negative X Positive = Negative:  $(-3) \times 4 = -12$

Positive X Negative = Negative:  $3 \times (-4) = -12$

## DIVIDING RULES:

Positive  $\div$  Positive = Positive:  $12 \div 3 = 4$

Negative  $\div$  Negative = Positive:  $(-12) \div (-3) = 4$

Negative  $\div$  Positive = Negative:  $(-12) \div 3 = -4$

Positive  $\div$  Negative = Negative:  $12 \div (-3) = -4$





## EXPONENTS & SQUARE ROOTS

An **exponent** indicates how many times a number (the base) should be multiplied by itself, For example,  $3^2$  means  $3 \times 3$  and is read "three to the second power" or "three squared."

For example:  $3^2 + 1 = 10$  ( $3 \times 3 = 9 + 1 = 10$ )

## SQUARE ROOTS

The **square root** ( $\sqrt{\quad}$ ) of a number, say 9, can be found by finding a number that when multiplied by itself is 9. ( $\sqrt{9} = 3$  because  $3 \times 3 = 9$ .)

The table lists some commonly used numbers and their squares. If you know the squares, you can find the square roots. For example:  $2^2 = 2 \times 2 = 4$  Another example:  $2^3 = 2 \times 2 \times 2 = 8$

$1^2 = 1$	$5^2 = 25$	$9^2 = 81$
$2^2 = 4$	$6^2 = 36$	$10^2 = 100$
$3^2 = 9$	$7^2 = 49$	$11^2 = 121$
$4^2 = 16$	$8^2 = 64$	$12^2 = 144$

## EQUATIONS

### Addition Equation

$$\begin{array}{r} X + 2 = 9 \\ - 2 \quad - 2 \\ \hline X = 7 \end{array} \quad \text{Step 1--Subtract 2 from each side}$$

### Subtraction Equation

$$\begin{array}{r} X - 7 = 4 \\ + 7 \quad + 7 \\ \hline X = 11 \end{array} \quad \text{Step 1--Add 7 to each side}$$

### Multiplication Equation

$$6X = 24 \quad \text{Step 1--Divide each side by 6}$$

$$\begin{array}{r} \cancel{6}X = 24 \\ \cancel{6} \quad \cancel{6} \end{array} \rightarrow = 4$$

### Division Equation

$$X/6 = 2 \quad \text{Step 1--Multiply each side by 6}$$

$$\begin{array}{r} \cancel{6} * X = 2(\cancel{6}) \\ \cancel{1} * \cancel{6} \\ \hline X = 12 \end{array} \quad \text{Step 2--Cross cancel 6s}$$



## RULES FOR WORKING WITH EQUATIONS

1. An equation is a statement that two quantities are equal.
2. Remove parentheses by multiplication, if needed.
3. Must get unknown value alone and on one side of the equation.
4. Always collect like terms.
5. Whatever you do to one side of the equal sign must be done to the other side of the equal sign.
6. Add and subtract first, multiply and divide last.

Good Luck and don't forget to...  
**PRACTICE, PRACTICE, PRACTICE!**