ALGEBRA

MATH REFRESHER PACKET

AT-ALGEBRA50

INTRODUCTORY ALGEBRA
REFRESHER PACKET

EDUCATION ENHANCEMENT CENTER

This Introductory Algebra refresher packet is compiled to assist students in refreshing some of the most common math skills that may have become rusty from lack of use. By reviewing this packet, your memory of the math concepts and practices learned in the past will improve. This packet contains three components. They are

Solving for "X" using addition/subtraction.

Solving for "X" using multiplication/division.

Solving for "X" using multiplication operations.

These materials should be reviewed in the order they are listed. Each component presents materials and then gives you practice exercises. Each unit has an answer key so you may check your own work.

INFORMATION SHEET #1

TERMS AND DEFINITIONS

ALGEBRA - Group of mathematical principles and rules by unknown values, in a formula, may be determined.

EQUATION - Two sets of numbers or values which are specified as being equal in total value or weight.

Example: $3X + 5 = 14$

VARIABLE - A symbol assigned to represent an unknown value. In algebra variables are usually represented by letters, specifically "X" on the equation $3X + 5 = 14$.

EXPONENT - A representative value of the number of times a specific number should be multiplied by itself. (Example: 3^2 or 10^3)

CONSTANTS - Numbers that have a fixed and known value. Example: $3X + 5 = 14$. In this case 5 and 14 are both constants.

DIVISOR - In a division problem the divisor is the number that is divided into the dividend. Example: $6/3 = 3$; 6 is the dividend.

DIVIDEND - In a division problem the dividend is the number which is divided by the divisor.

Example: $6/3 = 3$; 6 is the dividend.

QUOTIENT - The result of a division.

NUMERATOR - The number that is on the top of a fraction. (Similar to the dividend.)

DENOMINATOR - Number that is on the bottom of the fraction.

ADDEND - A value to be added to a given quantity.

SUBTRAHEND - A value to be subtracted from a given quantity.

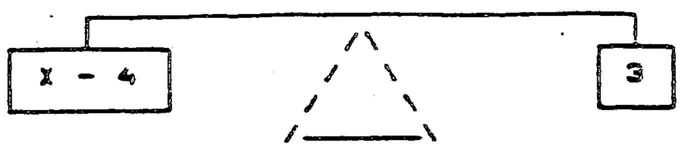
INFORMATION SHEET #2

BALANCING AN EQUATION

An equation, whether simple or complex, is merely a statement that two sets of values are equal. The term "equation" relays no values.

A good graphic example of an equation is a balance scale. Do you remember the old western movies about gold miners? When the miners brought gold to town, the assessor placed the prospectors gold in one side of the balance and known weights in the other side until the sides balanced. This allowed the assessor to determine how much gold a prospector had.

An equation is very similar to a balance scale. The equal sign (=) simply means that the values on the left are equal to the values on the right side of the equation. As an example let's look at the equation X - 4 = 3. On a balance scale it would look like this:



In algebra we say there is really no such thing as subtraction. Subtraction is really adding negative values. For example, 4 - 3 (four minus three) is really 4 + -3 (four plus negative three). Keeping this in mind, all the rules and examples discussed in this Information Sheet will be applied equally to addition and subtraction.

The objective in solving an equation is to find the value of the variable. To accomplish the task of finding the value of the variable, we must eventually end up with the variable (as a positive value) on one side of the equation and some constant value(s) on the other side of the equation. To accomplish this, we must perform some mathematical actions which move all constants from the side of the equation where the variable resides to the other side of the equation. In the equation X - 4 = 3, this means that we must eliminate the 4 from the left side of the equation.

When working with addition/subtraction, a value is eliminated by adding the opposite value to the original value. In the equation X - 4= 3, we can look at this equation as saying X + -4 = 3. In this case the opposite of -4 is +4. If we add -4 + 4 we get zero. Thus, we have eliminated the constant from the variable side of the equation. In the equation X + 9 = 42, the 9 is a positive value. To eliminate the 9 we will add -9. 9 + -9 = 0, we have again eliminated the constant from the variable side of the equation.

Now let's look at why we eliminated the constant. When we had X - 4 (same as X + -4) we added 4 to eliminate the -4. After adding 4, this is what the equation looked like:

$$X - 4 + 4 = ??????$$

When we add -4 and 4 we get zero.

$$X + -4 + 4 = ?????$$
$$X + 0 = ????????$$

When we end up with X + 0, or X - 0, we simply have X. This follows the same logic as 5 + 0 = 5, or 6 - 0 = 6

One last item to keep in mind. In order for the equation to remain balanced, <u>WHATEVER WE DO TO ONE SIDE OF THE EQUATION, WE MUST DO EQUALLY TO THE OTHER SIDE</u>. Let's look at the equation X - 4 = 3. First we will rewrite the equation:

$$X + -4 = 3$$

Now we will add the opposite of -4 (to eliminate -4).

$$X + -4 + 4 = 3 + 4$$

Notice that we added 4 to both sides of the equation. We must always do things equally to both sides of an equation. Now let's simplify what we have:

$$X + -4 + 4 = 3 + 4$$

$$X + 0 = 7$$

$$X = 7$$

The value of the variable X, in this case, is 7. To verify that we have the correct answer we will return to the original equation and substitute our answer, 7, for the variable X, and see if the equation is true.

Original equation: X - 4 = 3

Value of X = 7

Substitute value of X for X: 7 - 4 = 3

Is the equation true?

YES!

Let's look at another example: X + 9 = 42

Now we will add the opposite of 9 (to eliminate 9).

$$X + 9 + -9 = 42 + -9$$

Notice that we added -9 to both sides of the equation. We must always do things equally to both sides of an equation. Now let's simplify what we have:

$$X + 9 + -9 = 42 + -9$$

$$X + 0 = 33$$

$$X = 33$$

The value of the variable X, in this case, is 33. To verify that we have the correct answer we will return to the original equation and substitute our answer, 33, for the variable X, and see if the equation is true.

Original equation: $X + 9 = 42$

Value of $X = 33$

Substitute value of X for X: $33 + 9 = 42$

Is the equation true?

YES!

Let's look at one final example: $X + 19 = 12$

Now we will add the opposite of 19 (to eliminate 19).

$$X + 19 + -19 = 12 + -19$$

Notice that we added -19 to both sides of the equation. We must always do things equally to both sides of an equation. Now let's simplify what we have:

$$X + 19 + -19 = 12 + -19$$

$$X + 0 = -7$$

$$X = -7$$

The value of the variable X, in this case, is -7. To verify that we have the correct answer we will return to the original equation and substitute our answer, -7, for the variable X, and see if the equation is true.

Original equation: $X + 19 = 12$

Value of $X = -7$

Substitute value of X for X: $-7 + 19 = 12$

Is the equation true?

YES!

ASSIGNMENT SHEET #1

Directions: Solve for the variable in each of the following equations.

1. $X + 13 = 42$

2. $X - 10 = 86$

3. $X - 1.5 = 39$

4. $X + 42.86 = 101.55$

5. $2.687 + X = 14$

6. $Y - .879 = 1.0794$

7. $Z - 13.08 = 26.19$

8. $42.68 + Q = 14.23$

9. $X + 36 = -19$

10. $X - 5.1 = 10.6$

11. $Q + 13 = -43$

12. $13 + X = 41$

13. $X - 93 = 93$

14. $Y + 14 = 263$

15. $26.915 + X = 14.31$

16. $22.8 = 13 + X$

17. $43 = Y + 15$

18. $69 = 15 + Z$

19. $108 = 42 + X$

20. $.016 = .009 + Y$

INFORMATION SHEET #3

SOLVING FOR NEGATIVE VARIABLES

In the previous Information Sheet we discussed solution of equations using addition and subtraction. If you will notice, in all of the previous examples, X had a positive sign in the original equation. Even when the value of X was a negative number, such as X = -7, X has a positive sign implied.

In some cases we may end up with -X = 7. In these cases the solution of the equation is not complete until the variable has a positive sign. How do we change the sign of a number? Easy, simply multiply by -1. When we multiply a value by -1 we change the sign only, not the magnitude of the number.

Let's solve the equation 42 - X = 6.

First we will rewrite the equation:

$$42 + -X = 6$$

To eliminate the constant we will add the opposite of 42, which is -42. We now have:

$$42 + -42 + -X = 6 + -42$$

Now let's simplify what we have so far:

$$0 + -X = -36$$
$$-X = -36$$

The solution for X is not -36. We are not finished until the variable has a positive sign. To change the sign we will multiply both sides of the equation by -1. Remember, whatever we do to one side of an equation we must also do to the other side.

$$-X \cdot -1 = -36 \cdot -1$$

$$X = 36$$

Now let's check our answer.

Original equation: 42 - X = 6

Value of X is 36 42 - 36 = 6

Is the equation true?

YES!

ASSIGNMENT SHEET #2

Directions: Solve for the variable in each of the following equations.

1. $X - 13 = 42$

2. $X - 10 = 86$

3. $X - 1.5 = 39$

4. $101.55 - X = 42.86$

5. $2.687 - X = 14$

6. $1.87 - Y = 1.0794$

7. $43.08 - Q = 26.19$

8. $42.68 - Q = 14.23$

9. $29 - X = -19$

10. $X - 5.1 = 10.6$

11. $113 - Z = 43$

12. $13 - X = 41.87$

13. $.0163 = X - .008$

14. $1.065 = 15 - Y$

15. $.835 = X + .065$

16. $.9156 = 1.08 - X$

17. $13 + 2 = Y - 5$

18. $.813 = .005 + X$

19. $9.5 = 13 - X$

20. $86 = 3 - Y$

INFORMATION SHEET #4

MULTIPLICATION / DIVISION

In Information Sheet #2 we said that there is really no such thing as subtraction. Subtraction is really adding negative values. The same principle applies to multiplication and division. Division is really multiplying by a reciprocal. A reciprocal is simply a number, written in fractional form, inverted (turned up side-down). For example the reciprocal of 6 is 1/6 (one-sixth) the reciprocal of 2/3 (two-thirds) is 3/2 (three-halves).

An example: $4 \div 3$ (four divided by three) is really $4 \cdot 1/3$ (four times one-third). Keeping this in mind, all the rules and examples discussed in this Information Sheet will apply equally to multiplication and division.

The objective in solving an equation is to find the value of the variable. To accomplish the task of finding the value of the variable, we must eventually end up with the variable (as a positive value) on one side of the equation and some constant value(s) on the other side of the equation. To accomplish this, we must perform some mathematical actions which remove all constants from the side of the equation where the variable resides. In the equation $X \cdot 4 = 3$, this means that we must eliminate the 4 from the left side of the equation.

When working with multiplication/division, a value is eliminated by multiplying by the reciprocal value to the original value. In the equation $X \div 4 = 3$, we can look at this equation as saying $X \cdot 1/4 = 3$. In this case, the reciprocal of 4 is 1/4. If we multiply a number by its reciprocal we get one (1). For example, $X \cdot 4 \cdot 1/4$ leaves $X \cdot 1$, or X. Thus, we have eliminated the constant from the variable side of the equation. In the equation $X \cdot 9 = 42$, to eliminate the 9 we will multiply by the reciprocal of 9 or 1/9 (one-ninth). We have again eliminated the constant from the variable side of the equation.

Now let's look at why we eliminated the constant. When we had $X \div 4$ (same as $X \cdot 1/4$) we multiplied by 4 to eliminate the 1/4.

After multiplying by 4, this is what the equation looked like:

$$X \cdot 1/4 \cdot 4 = ????????????$$

When we multiply $1/4 \cdot 4$ we get one.

$$X \cdot 1/4 \cdot 4 = ??????????$$

$$X \cdot 1 = ??????????$$

When we end up with $X \cdot 1$, or $X \div 1$, we simply have X. This follows the same logic as $5 \cdot 1 = 5$, or $6 \div 1 = 6$.

One last item to keep in mind, In order for the equation to remain balanced, whatever we do to one side of the equation, we must do equally to the other. This rule applies for all mathematical operations we perform on an equation.

Let's look at the equation $X \div 4 = 3$. First we will rewrite the equation:

$$X \cdot 1/4 = 3$$

Now we will multiply by the reciprocal 4.

Notice that we multiplied both sides of the equation. We must always do things equally to both sides of an equation. Now let's simplify what we have:

$$X \cdot 1/4 \cdot 4 = 3 \cdot 4$$

$$X \cdot 1 = 12$$

$$X = 12$$

The value of the variable X, in this case, is 12. To verify that we have the correct answer we will return to the original equation and substitute our answer, 12, for the variable X, and see if the equation is true.

Original equation: $X \div 4 = 3$

Value of $X = 12$

Substitute value of X for X: $12 \div 4 = 3$

Is the equation true?

YES!

Let's look at another example: $X \cdot 9 = 42$.

Now we will multiply by the reciprocal (to eliminate 9).

$$X \cdot 9 \cdot 1/9 = 42 \cdot 1/9$$

Notice that we multiplied both sides of the equation. We must always do things equally to both sides of an equation. Now let's simplify what we have:

$$X \cdot 9 \cdot 1/9 = 42 \cdot 1/9$$

$$X \cdot 1 = 42/9$$

$$X = 4.66$$

The value of the variable X, in this case, is 4.66. To verify that we have the correct answer we will return to the original equation and substitute our answer, 4.66, for the variable X, and see if the equation is true.

Original equation: $X \cdot 9 = 42$

Value of X = 4.66

Substitute value of X for X: $4.66 \cdot 9 = 42$

Is the equation true?

YES!

Let's look at one final example: $X \cdot 9 = -63$

Now we will multiply by the reciprocal of 9 (to eliminate 9).

$$X \cdot 9 \cdot 1/9 = -63 \cdot 1/9$$

Notice that multiplied by 1/9 on both sides of the equation. We must always do things equally to both sides of an equation.

Now let's simplify what we have:

$$X \cdot 9 \cdot 1/9 = -63 \cdot 1/9$$

$$X \cdot 1 = -63/9$$

$$X = -7$$

The value of the variable X, in this case, is -7. To verify that we have the correct answer we will return to the original equation and substitute our answer, -7, for the variable X, and see if the equation is true.

Original equation: $X \cdot 9 = -63$

Value of X = -7

Substitute value of X for X: $-7 \cdot 9 = -63$

Is the equation true?

YES!

One last note on multiplication and division. Normally we do not show the multiplication or division signs. Multiplication is noted as such:

$4 \cdot X$ will be $4X$

$4 \div X$ will be $4 / X$

ASSIGNMENT SHEET #3

Directions: Solve for the variable in each of the following equations.

1. X/3 = 9
2. X/9 = 14.36
3. X/1.7 = 19
4. 14 = 2853X
5. 46.35 = X/8
6. 42 = 3X
7. 1.35 = 2X
8. 3X = 43
9. 10.5X = 36
10. X/186.35 = 19.02
11. X/2 = 46
12. 168 = 4X
13. 92 = 6X
14. .005 = 10X
15. X/168 = 99
16. X/5 = 19
17. 1.09 = 4.3X
18. 1.035 = X/4
19. 42 = X/6
20. 2X = 36

INFORMATION SHEET #5

FRACTIONAL VARIABLES

In the previous Information Sheet we discussed the solution of equations using multiplication and division. If you will notice, in all of the previous examples, X was never the divisor in the original equation. In some cases we may face a math problem where 1/X = 7. In these cases the solution of the equation is not complete until the variable is a whole value. How do we change the fractional form of a number? Easy - Simply invert both sides of the equation.

Let's solve the equation 42/X = 6.

First we will rewrite the equation:

$$42 \cdot 1/X = 6$$

To eliminate the constant, we will multiply by the reciprocal of 42, which is 1/42. We now have:

$$42 \cdot 1/42 \cdot 1/X = 6 \cdot 1/42$$

Now let's simplify what we have so far:

$$1 \cdot 1/X = 6/42$$

$$1/X = 6/42$$

The solution for X is not 6/42. We are not finished until the variable has a whole value. To change the fractional form we will invert both sides of the equation. Remember, whatever we do to one side of an equation we must also do to the other side.

$$X/1 = 42/6$$

$$X = 7$$

Now let's check our answer.

Original equation:	$42/X = 6$
Value of X = 7	$42/7 = 6$

Is the equation true?

YES!

Another way to look at this type of equation is: 42/X = 6.

Think of 42/X as a fraction (42/X). The numerator is 42 and the denominator is X.

Because 42 is divided by X (42/X), we will take the opposite of division which is multiplication.

We will multiply using the same variable in the denominator (bottom number of the fraction).

$$42/X = 6$$

$$X \cdot 42/X = 6 \cdot X$$

Multiply by X on both sides of the equation.

The X's cancel each other out.

$$X \cdot 42/X = 6 \cdot X$$

$$42 = 6X$$

To solve the rest of the equation you again take the opposite operation. Since 6X means 6 multiplied by X, you take the opposite of multiplication which is division. You will divide 6X by 6.

$$42 = 6X$$

$$42/6 = 6X/6$$

Divide by 6 on both sides of the equation.

The 6's cancel each other out.

$$42 = 6X$$

$$42/6 = 6X/6$$

$$7 = X$$

Let's review the entire process:

1.	$42/X = 6$	
2.	$X \cdot 42/X = 6 \cdot X$	Multiply both sides of the equation by X.
3.	$\not{X} \cdot 42/\not{X} = 6 \cdot X$	The X's cancel out.
4.	$42 = 6X$	
5.	$42/6 = 6X/6$	Divide both sides of the equation by 6.
6.	$42/6 = 6X/6$	The 6's cancel out.
7.	$42/6 = X$	Divide 42 by 6.
8.	$7 = X$	

ASSIGNMENT SHEET #4

Directions: Solve for the variable in each of the following equations.

1. $42 = 5/X$
2. $X/9 = 22$
3. $92.6/X = 13$
4. $4X = 6$
5. $43 - X = 9$
6. $3/X = 81$
7. $3X/9 = 14$
8. $13/X = 15$
9. $1.305/X = 42$
10. $X + 9 = 43$
11. $1.56/X = 0.087$
12. $39/X = 102.68$
13. $142.86 = 3/X$
14. $X/13.5 = 48$
15. $2.86X = 39$
16. $X = 14 \cdot 6$
17. $1.82 = 2/X$
18. $0.0063 = 9/X$
19. $3/X = 1.83$
20. $X/14 = 28$

INFORMATION SHEET #6

SOLVING FOR UNKNOWN WHEN USING PARENTHESIS

The equation $2(2 + x) = 10$ means:

2 times the numbers or variables in the parenthesis.

$$2(2 + X) = 10$$

$$2 \cdot 2 + 2 \cdot x = 10$$

$$4 + 2x = 10$$

Another example:

$$3(5 + x) = 30$$

All items inside the parenthesis are multiplied by 3:

$$3(5 + x) = 30$$

$$3 \cdot 5 + 3 \cdot x = 30$$

$$15 + 3x = 30$$

To solve the equation $5(a + 5) = 50$, there are two methods. Use the method you prefer:

METHOD 1

$$5(a + 5) = 50$$

Multiple the items in the parenthesis by 5

$$5 \cdot a + 5 \cdot 5 = 50$$

$$5a + 25 = 50$$

To solve the equation, which has multiple operations, it is important to solve the equation in the correct order. In solving an equation for an unknown (variable), the following order should be followed.

1. Add/subtract (from left to right)
2. Multiply/divide (from left to right)

STEP 1: Add/subtract: $5a + 25 = 50$

$$5a + 25 = 50$$ take the opposite of a +25

$$-25 \quad -25$$ on both sides of the equal sign.

$$5a + 0 = 25$$ The opposite of a +25 is a -25

$$5a = 25$$

STEP 2: Multiply/divide: $5a = 25$

$$\frac{5a}{5} = \frac{25}{5}$$

$$a = 5$$

Since 5a means 5 multiplied by a, take the opposite operation of multiplication (which is division) and divide by 5 on both sides of the equal sign.

METHOD 1: Now let's check the answer:

Original equation: $5(a + 5) = 50$

Answer $a = 5$

Plug the answer 5 in where "a" is found.

(a)
$5(5 + 5) = 50$ Add the numbers inside the parenthesis

$5(10) = 50$

$5 \cdot 10 = 50$ multiply

$50 = 50$ Yes, the equations is true thus $a = 5$

METHOD 2: "SHORTCUT"

$5(a + 5) = 50$

Since "a + 5" is multiplied by 5, take the opposite operation of multiplication (which is division) and divide by 5 on both sides of the equal sign:

$$\frac{\cancel{5}(a + 5)}{\cancel{5}} = \frac{50}{5}$$

EXAMPLE A:

$a + \cancel{5} = 10$ Take the opposite of a + 5 which is a -5 on both sides of the equal sign.
$\cancel{-5} \quad -5$
$a = 5$

EXAMPLE B:

$3(9 + X) = 36$

$$\frac{\cancel{3}(9 + X)}{\cancel{3}} = \frac{36}{3}$$ *Divided by 3 on both sides of the equal sign*

$9 + X = 12$ Take the opposite of +9 on both sides of the equal sign (-9).
$-9 \quad\quad -9$
$0 \quad + X = 3$
$x = 3$

CHECK: Original equation: $3(9 + X) = 36$
Answer: $X = 3$ Plug 3 in where "X" is found
(X)
$3(9 + 3) = 36$
$3(12) = 36$
$36 = 36$ Yes the equation is true $x = 3$

ASSIGNMENT SHEET #5

SOLVING FOR AN UNKNOWN USING PARENTHESIS

1. $6\,(x + 12) = 72$

2. $4\,(a + 2) = 28$

3. $3\,(y + 12) = 45$

4. $2\,(x + 20) = 100$

5. $6\,(4 + y) = 54$

6. $8\,(2 + x) = 86$

7. $11\,(4 + x) = 88$

8. $5\,(10 + y) = 105$

9. $3\,(9 + a) = 30.6$

10. $2\,(10 + B) = 97$

INFORMATION SHEET #7

ANSWERS TO ASSIGNMENT SHEET #1

1. X = 29
2. X = 96
3. X = 40.5
4. X = 58.69
5. X = 11.313
6. Y = 1.9584
7. Z = 39.27
8. Q = -28.45
9. X = -55
10. X = 15.7
11. Q = -56
12. X = 28
13. X = 186
14. Y = 249
15. X = -12.605
16. 9.8 = X
17. 28 = Y
18. 54 = Z
19. 66 = X
20. 0.007 = Y

INFORMATION SHEET #7

ANSWERS TO ASSIGNMENT SHEET #2

1. X = 55
2. X = 96
3. X = 40.5
4. X = 58.69
5. X = -11.313
6. X = 0.7906
7. Q = 16.89
8. Q = 28.45
9. X = 48
10. X = 15.7
11. Z = 70
12. X = -28.87
13. 0.0243 = X
14. 13.935 = Y
15. 0.77 = X
16. 0.1644 = X
17. 20 = Y
18. 0.808 = X
19. 3.5 = X
20. -83 = Y

INFORMATION SHEET #7 (CONT.)

ANSWERS TO ASSIGNMENT SHEET #3

1. X = 27
2. X = 129.24
3. X = 32.3
4. X = 0.00489
5. X = 370.8
6. X = 14
7. X = 0.675
8. X = 14.33
9. X = 3.43
10. X = 3,544.377
11. X = 92
12. X = 42
13. X = 15.33
14. X = 0.0005
15. X = 16,632
16. X = 95
17. X = 0.253
18. X = 4.14
19. X = 252
20. X = 18

INFORMATION SHEET #7

ANSWERS TO ASSIGNMENT SHEET #4

1. X = 0.119
2. X = 198
3. X = 7.123
4. X = 1.5
5. X = 34
6. X = - 0.037
7. X = 42
8. X = 0.8667
9. X = 0.031
10. X = 34
11. X = 17.93
12. X = 0.38
13. X = 0.021
14. X = 648
15. X = 13.636
16. X = 84
17. X = 1.099
18. X = 1,428.57
19. X = 1.639
20. X = 392

INFORMATION SHEET #7 (CONT.)

ANSWER TO ASSIGNMENT SHEET #5

1. $$\frac{6(x + 12)}{6} = \frac{72}{6}$$

$$x + 12 = 12$$
$$\underline{\quad -12 \quad -12}$$
$$x = 0$$

2. $$\frac{4(a + 2)}{4} = \frac{28}{4}$$

$$a + 2 = 7$$
$$\underline{\quad -2 \quad -2}$$
$$a = 5$$

3. $$\frac{3(y + 12)}{3} = \frac{45}{3}$$

$$y + 12 = 15$$
$$\underline{\quad -12 \quad -12}$$
$$y = 3$$

4. $$\frac{2(x + 20)}{2} = \frac{100}{2}$$

$$x + 20 = 50$$
$$\underline{\quad -20 \quad -20}$$
$$x = 30$$

5. $$\frac{6(4 + y)}{6} = \frac{54}{6}$$

$$4 + y = 9$$
$$\underline{-4 \quad\quad -4}$$
$$y = 5$$

6. $$\frac{8(2 + x)}{8} = \frac{86}{8}$$

$$2 + x = 10.75$$
$$\underline{-2 \quad\quad -2}$$
$$x = 8.75$$

ANSWERS TO ASSIGNMENT SHEET #5

7. $\frac{11\,(4 + x)}{11} = \frac{88}{11}$

$$4 + x = 8$$
$$-4 \qquad -4$$
$$x = 4$$

8. $\frac{5\,(10 + y)}{5} = \frac{105}{5}$

$$10 + y = 21$$
$$-10 \qquad -10$$
$$y = 11$$

9. $\frac{3\,(9 + a)}{3} = \frac{30.6}{3}$

$$9 + a = 10.2$$
$$-9 \qquad -9$$
$$a = 1.2$$

10. $\frac{2\,(10 + B)}{2} = \frac{97}{2}$

$$10 + B = 48.5$$
$$-10 \qquad -10$$
$$B = 38.5$$