Immaculate Heart Academy
Summer Math Assignment for
Algebra I Honors
Course Code: (5130)

LEARN  **EXCEL**

You are taking **Algebra I Honors** in the fall. A mastery of and proficiency in performing the following Pre-Algebra skills will be necessary for success in this Algebra I **Honors level course**. Work on each problem in order. Copy the problem onto loose-leaf paper **except where you are directed to show all work in the space provided or to present graphs**. Show all work in a neat and organized manner. Box in your final answer. Complete this entire assignment and bring it to class on the first day.

This assignment is mandatory and the math department strongly encourages you do this assignment on your own and to the best of your ability. Since the material contained in the summer math packet is *prerequisite material* you are responsible for having learned and retained. If you have forgotten any of these important mathematical concepts, you will find at the end of this assignment, several links to websites that you might find helpful should you have any problems or need some additional support on this assignment.

At the end of this assignment are several links to websites that you might find helpful should you have any problems with your assignments.

Name: _____ **Date:** _____

FRACTION REVIEW

It is extremely important that you be able to do all of this work *without* a calculator! Your final answer is to be presented in reduced fraction form. It is unnecessary to convert it to a mixed number – NO DECIMALS!

Addition and Subtraction:

1. $\frac{5}{8}-\frac{3}{8}$
2. $\frac{5}{12}+\frac{3}{12}$
3. $\frac{1}{2}+\frac{1}{8}$
4. $\frac{3}{5}-\frac{1}{10}$
5. $\frac{7}{10}+\frac{1}{3}$
6. $5\frac{1}{8}-2\frac{3}{4}$
7. $1\frac{3}{7}+\frac{1}{2}$
8. $4\frac{3}{8}-2\frac{5}{6}$
9. $\frac{3}{7}+\frac{3}{4}$
10. $5\frac{5}{9}-2\frac{1}{3}$
11. $4\frac{5}{8}-1\frac{3}{16}$
12. $9\frac{2}{5}+3\frac{1}{3}$
13. $6-2\frac{3}{8}$
14. $6\frac{5}{7}-2\frac{1}{5}$
15. $\frac{24}{25}-\frac{1}{5}$

Multiplication:

1. $\frac{1}{2}\cdot\frac{1}{2}$
2. $\frac{5}{8}\cdot\frac{4}{15}$
3. $\frac{7}{9}\cdot\frac{1}{5}$
4. $1\frac{2}{3}\cdot\frac{3}{5}$
5. $3\cdot 2\frac{5}{9}$
6. $5\frac{1}{4}\cdot 1\frac{1}{7}$
7. $\frac{5}{9}\cdot 1\frac{1}{2}$
8. $\frac{7}{8}\cdot\frac{4}{9}$
9. $4\frac{1}{4}\cdot\frac{2}{3}$
10. $8\frac{1}{2}\cdot\frac{1}{4}$

Division:

1. $\frac{7}{8}\div\frac{3}{4}$
2. $\frac{5}{12}\div\frac{1}{2}$
3. $\frac{4}{5}\div\frac{2}{3}$
4. $\frac{11}{16}\div 1\frac{1}{2}$
5. $4\frac{1}{2}\div\frac{3}{4}$
6. $2\frac{1}{4}\div 1\frac{1}{3}$
7. $3\frac{2}{5}\div 4$
8. $\frac{3}{10}\div\frac{1}{5}$
9. $\frac{4}{5}\div\frac{1}{2}$
10. $8\frac{4}{5}\div 1\frac{1}{3}$
11. $\frac{12}{13}\div\frac{12}{13}$
12. $\frac{\frac{24}{3}}{8}$
13. $\frac{\frac{4}{7}}{\frac{4}{5}}$

EVALUATING EXPRESSIONS

You must apply the correct **Order of Operations** to do this work successfully.

1. $15 \div 3 \bullet 6$
2. $8 + 3(7 - 4) - (13 - 9)$
3. $3[2 + 5(3 - 1)]$
4. $2[3(7 - 5) + 4(8 + 2)]$
5. $18 + 7 \bullet 6 \div 2$
6. $23 - [(5 - 2)^2 + 8 \div 4]$
7. $\dfrac{2 \bullet 7 + 5 \bullet 3}{30 - 29}$
8. $8 + 2 \bullet 3^2 - 3 + 4^2 - 5$
9. $[(2 + 4 \bullet 3) - 8] + 9^2$
10. $\dfrac{20 - [4^2 \div (2 + 14)] + 5}{4^2 - 13}$

TRANSLATING VERBAL PHRASES AND SENTENCES INTO ALGEBRAIC EXPRESSIONS

Translate each of the following into an algebraic expression:

1. eight more than a number x
2. the product of six and a number y
3. one-half of a number m
4. the difference of seven and a number z
5. the sum of fifteen and a number x
6. the quotient of twice a number x and twelve

7. three less than* the square of a number ***d***

8. seven less than* twice a number ***t***

9. five more than three times a number ***w***

10. three times the sum of seven and a number ***y***

11. the product of fifteen and the quantity twelve more than a number ***s***

12. The sum of 42 and a number ***y*** is equal to 51.

13. The difference of 9 and the quotient of a number ***d*** and 6 is 5.

14. The sum of 12 and eight times a number ***k*** is equal to 48.

15. The product of 9 and the quantity 5 more than a number ***t*** is less than 6.

16. Two less than the product of 3 and a number ***x*** is greater than the sum of ***x*** and 5.

17. A number ***b*** subtracted from* 12 is less than or equal to 7.

18. twice a number less the square of the number.

19. the square of a number decreased by twice the number.

20. seven times the cube of the quantity "***b***" minus four.

21. four divided by the difference of a number and six.

22. the product of three and the quantity two less than* "***b***," increased by six

23. the square of the sum of "***x***" and "***a***"

24. the sum of the square of "***x***" and the square of "***a***"

SIMPLIFYING EXPRESSIONS

1. $-3+6$
2. $8+(-11)$
3. $-4+(-5)$
4. $-1-4$
5. $-11-(-3)$
6. $-13+5-7$
7. $9-(-5)-3$
8. $-3\frac{1}{2}+7\frac{2}{5}-9\frac{3}{10}$
9. $-\frac{3}{4}\left(-\frac{1}{3}\right)\left(-\frac{8}{9}\right)$
10. $-2(-6)(-3x)$
11. $-3(-2a^3)$
12. $-2(x+7)$
13. $(p-3)(-8)$
14. $\frac{2}{3}(6n-9)$
15. $-5.3m+2.5m$
16. $13p-(-5p)$
17. $9+7y-2-5y$
18. $7-3(x-5)$
19. $7x^2-10-2x^2+5$
20. $-13x \div \left(-4\frac{1}{3}\right)$
21. $-12 \div 42$
22. $\left(-\frac{4}{5}\right) \div (-8)$
23. $\left(\frac{6}{7}\right) \div \left(-\frac{9}{14}\right)$

VARIABLES IN ALGEBRA

Evaluate the expressions when $x = 3$.

1. $7x$
2. $\frac{12}{x}$
3. $x+9$
4. $20-x$
5. $\frac{x}{15}$
6. $16+x$
7. $x-2$
8. $\frac{5}{6}+x$
9. $\frac{3}{4}x$

EXPONENTS AND POWERS

Evaluate:

1. 1^5
2. 3^4
3. $\left(\frac{3}{5}\right)^3$
4. $(d-3)^2$ ***when*** $d = 13$
5. $16+x^3$ ***when*** $x = 2$

SOLVING LINEAR EQUATIONS

1. $x+4=3$
2. $-8+x=5$
3. $4x=-84$
4. $-5x=75$
5. $11=\frac{x}{6}$
6. $\frac{3}{4}x=-27$
7. $9x+5=23$
8. $11=5x-4$
9. $\frac{3}{2}x+2=20$
10. $8-5(4-x)=11$
11. $4x-(x-4)=-20$
12. $8x-3(2x+5)=13$

RATIOS and PROPORTIONS

SOLVE each of the following proportions. Use the Law of Cross-Products:

If $\frac{a}{b}=\frac{c}{d}$ **and** $b\neq 0$ **and** $d\neq 0$, **then** $ad=bc$.

1. $\frac{3x}{27}=\frac{2}{3}$
2. $\frac{13}{6}=\frac{52}{X}$
3. $\frac{x}{x-12}=\frac{9}{5}$
4. $\frac{18}{x+13}=\frac{6}{x-13}$
5. $\frac{x-8}{-2}=\frac{11-4x}{11}$
6. $\frac{x-8}{7+x}=\frac{-1}{5}$

SOLVING PERCENT PROBLEMS

SOLVE each of the following. Be sure to present either a proportion or a percent equation.

1. What percent of 90 is 15?
2. What number is 12% of 75?
3. 51 is 37.5% of what number?
4. What percent of 18 is 4.5?
5. What number is 150% of 90?
6. What percent of 96 is 18?

7. 81 is 54% of what number?

8. What number is 42% of 115?

9. What number is $66\frac{2}{3}\%$ of 48?

10. What number is $33\frac{1}{3}\%$ of 114?

11. A class of 27 students has 15 girls. What percent of the class is boys?

12. The price of a CD player is \$98. What will this CD player cost after a 25% discount? What will the final cost be after a 7% sales tax is added to the discounted price of this CD player? (**Note:** tax is calculated on the sales price, not the original price)

% CHANGE PROBLEMS

A proportion can be used to determine the percent of change:

$$\frac{\textit{Amount of increase or decrease}}{\textit{Original amount}} = \frac{p}{100}$$

The ***amount of increase*** is the new amount minus the original amount.
The ***amount of decrease*** if the original amount minus the new amount.

Calculate the percent of change and identify it as an ***increase*** or a ***decrease***.

1. Original: 16
   New: 20

2. Original: 35
   New: 49

3. Original: 80
   New: 44

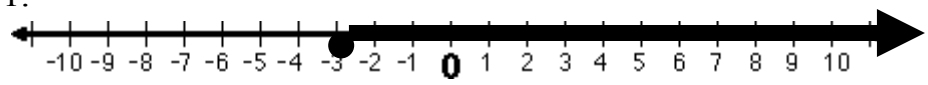
4. Original: 120
   New: 78

5. The price for a subway token is changing from \$1.25 to \$1.50. Find the percent of change.

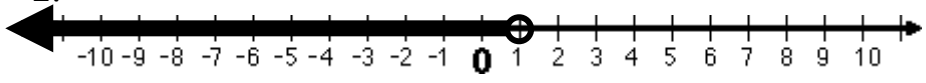
6. The average price of a new DVD in 1998 was \$24. In 2003, the average price was \$21.12. Find the percent of change.

INEQUALITIES & THE NUMBER LINE

Write an inequality for each graph. Make sure each starts off with "x."

1. 

1._____

2. 

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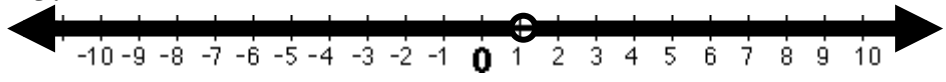
3. 

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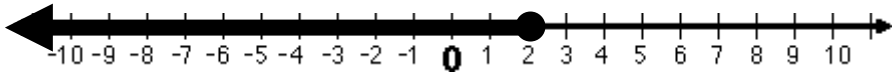
4. 

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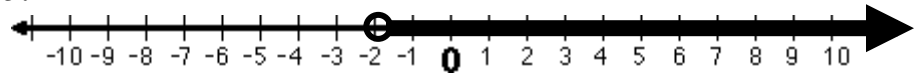
5. 

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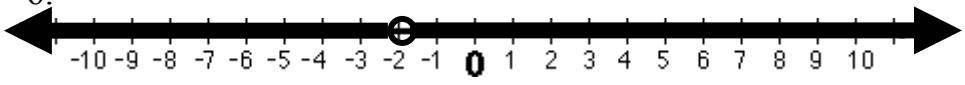
6. 

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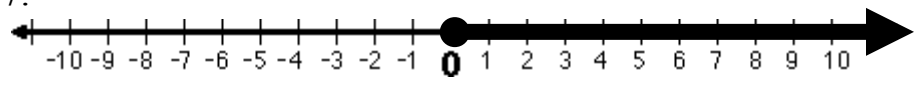
7. 

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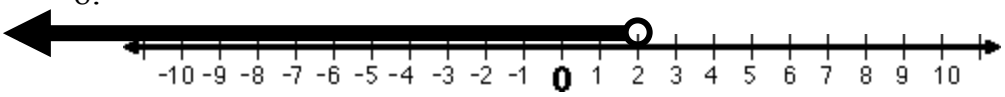
8. 

8._____

Graph the solution set of each inequality on a number line.

11. $x \geq 4$ 12. $y \leq -2$ 13. $m \neq 0$ 14. $x < 3$

15. $a > -2$ 16. $x \geq -1$ 17. $y \neq -2$ 18. $w \geq 1$

Write an algebraic expression for each verbal expression.

19. z is at least negative 3

20. k is no less than negative 1

21. y is at most negative 2

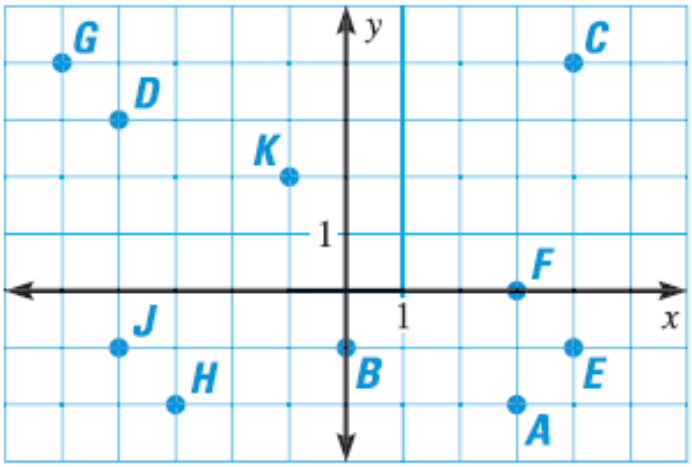
22. l is positive

PLOT POINTS IN A COORIDINATE PLANE

Name the coordinates of each of the following points.

1. A **2. B** **3. C** **4. D**

5. E **6. F** **7. G** **8. H**



Complete each of the following statements.

9. $R(-3,-4)$ lies in Quadrant _____.

10. $P(5,5)$ lies in Quadrant _____.

11. $S(3,-2)$ lies in Quadrant _____.

12. $Q(-1,5)$ lies in Quadrant _____.

13. Does $T(-3,0)$ lie within a quadrant?

Explain your answer.

14. $(0,0)$ is known as the _____. Explain the significance of this point.

UNIT RATE

If *a* and *b* are two quantities measured in different units, then the **rate of *a* per *b*** is $\frac{a}{b}$. A **unit rate** is a rate per one unit of a given quantity. To determine a unit rate, write the rate with a denominator of 1. **It is extremely important that you be able to do all of this work *without* a calculator!**

1. \$90 for 4 tickets.
2. \$51 for 6 hours.
3. 208 miles in 4 hours.
4. 128 ounces for 16 people.
5. \$8.67 for 3 notebooks
6. 65 meters in 3 seconds.

Scientific Notation

Write each number in scientific notation. Example: **$600 = 6 \times 10^2$**

1. **4500** 2. **.0005** 3. **123000000** 4. **.0000063**

Write each number in standard notation.

1. **3×10^{-3}** 2. **2.7×10^4** 3. **5.1×10^7** 4. **1.3×10^{-6}**

ALGEBRAIC PROBLEM SOLVING

Remember to:

1. **Carefully read the problem.**
2. **Define the variable by presenting a formal "let" statement.**
3. **Write an algebraic equation that models the given situation.**
4. **Solve your equation.**
5. **Confirm the accuracy of your result.**

1. At a lake, there are 2 boat rental shops. Shop A charges $210 for a 4-hour rental, and Shop B charges $228 for a 6-hour rental. Which shop charges more per hour? How much more expensive is this shop?
2. You are saving money to buy a $200 video game system. You earn $20 a week for doing chores around the house. You get $35 from a relative on your birthday. How many whole weeks will it take for you to have enough money to buy the system?
3. Your soccer team has raised $400 for cleats and shin guards. It will cost $41.50 for each of the 15 players to have a pair of cleats and shin guards. How much more money will each player have to pay to cover the cost?
4. You are using solid colored fabric that costs $.06 per square and patterned fabric that costs $.10 per square to make a quilt. You need 660 squares to complete the quilt and 200 of them are solid colored. What is the total cost of the quilt?
5. You are working at a car wash to raise money for a charity. By the end of the day, you raised $342. You charged $6 for each car wash.
   a) How many cars were washed during the day?
   b) If you had charged $6.50 for each car wash, how much more money would you have made?
6. A town's water tower holds 1 million gallons of water. During the day, the tower is only two-fifths of its full capacity. The tower will be refilled at night, when water consumption is low, using a pump that pumps water into the tower at a rate of 2000 gallons of water per minute. How long will it take to bring the tower back to full capacity?
7. Central High's enrollment decreases at an average rate of 55 students per year, while Washington High's enrollment increases at an average rate of 70 students per year. Central High has 2176 students and Washington High has 1866 students. If enrollments continue to change at the same rate, when will the two schools have the same number of students?