

Integrated Math I Summer Packet

Congratulations! Welcome to Integrated Math!

I look forward to working with you next school year and preparing you for **Integrated Math II!**

While you are enjoying your summer, please take time out to complete the attached assignment. This packet is designed to help make the transition into this course as smooth as possible (and to keep your math skills from deteriorating from lack of use).

You should recognize these concepts from prior math courses. ***Unless specifically noted, all work in this packet should be shown and done without a calculator and all final answers should be exact values.*** It is very important that you complete the summer work and understand all of the concepts covered therein. ***Packets will be collected on the first day of school and will be graded based on completion.***

It is extremely important that you know and understand these foundational skills and concepts, as we will be building upon these throughout the school year. Our suggestion would be to do a little at a time throughout the summer so that math remains fresh in your mind. If you do a few problems per week, you will have plenty of time to get the packet done and still enjoy your summer.

We look forward to seeing you and working with you in the fall.

Best,

Integrated Math I Teachers

Westhill High School

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Order of Operations

To avoid having different results for the same problem, mathematicians have agreed on an order of operations when simplifying expressions that contain multiple operations.

1. Perform any operation(s) inside grouping symbols. (Parentheses, brackets above or below a fraction bar)
2. Simplify any term with exponents.
3. Multiply and divide in order from left to right.
4. Add and subtract in order from left to right.

One easy way to remember the order of operations process is to remember the acronym PEMDAS or the old saying, "Please Excuse My Dear Aunt Sally."

- P** - Perform operations in grouping symbols
- E** - Simplify exponents
- M** - Perform multiplication and division in order from left to right
- D**
- A** - Perform addition and subtraction in order from left to right
- S**

Example 1

$$\begin{aligned}2 - 3^2 + (6 + 3 \times 2) \\2 - 3^2 + (6 + 6) \\2 - 3^2 + 12 \\2 - 9 + 12 \\-7 + 12 \\= 5\end{aligned}$$

Example 2

$$\begin{aligned}-7 + 4 + (2^3 - 8 + -4) \\-7 + 4 + (8 - 8 + -4) \\-7 + 4 + (8 - -2) \\-7 + 4 + 10 \\-3 + 10 \\= 7\end{aligned}$$

Order of Operations

Evaluate each expression. Remember your order of operations process (PEMDAS).

1. $6 + 4 - 2 \cdot 3 =$

2. $(-2) \cdot 3 + 5 - 7 =$

3. $15 \div 3 \cdot 5 - 4 =$

4. $29 - 3 \cdot 9 + 4 =$

5. $20 - 7 \cdot 4 =$

6. $4 \cdot 9 - 9 + 7 =$

7. $50 - (17 + 8) =$

8. $(12 - 4) \div 8 =$

9. $12 \cdot 5 + 6 + 6 =$

10. $18 - 4^2 + 7 =$

11. $3(2 + 7) - 9 \cdot 7 =$

12. $3 + 8 \cdot 2^2 - 4 =$

13. $16 \div 2 \cdot 5 \cdot 3 + 6 =$

14. $12 \div 3 - 6 \cdot 2 - 8 \div 4 =$

15. $10 \cdot (3 - 6^2) + 8 \div 2 =$

16. $6 \cdot 9 - 3 \cdot 2 \cdot (10 \div 5) =$

17. $32 \div [16 \div (8 \div 2)] =$

18. $[10 + (2 \cdot 8)] \div 2 =$

19. $180 \div [2 + (12 \div 3)] =$

20. $\frac{1}{4}(3 \cdot 8) + 2 \cdot (-12) =$

21. $\frac{5 + [30 - (8 - 1)^2]}{11 - 2^2} =$

22. $\frac{3[10 - (27 \div 9)]}{4 - 7} =$

23. $5(14 - 39 \div 3) + 4 \cdot \frac{1}{4} =$

24. $[8 \cdot 2 - (3 + 9)] + [8 - 2 \cdot 3] =$

25. $162 \div [6(7 - 4)^2] \div 3 =$

Operations with Signed Numbers

Adding and Subtracting Signed Numbers

Adding Signed Numbers

Like Signs	Different Signs
Add the numbers & carry the sign	Subtract the numbers & carry the sign of the larger number
$(+) + (+) = +$ $(+3) + (+4) = +7$	$(+) + (-) = ?$ $(+3) + (-2) = +1$
$(-) + (-) = -$ $(-2) + (-3) = (-5)$	$(-) + (+) = ?$ $(-5) + (+3) = -2$

Subtracting Signed Numbers

Don't subtract! Change the problem to **addition** and change the sign of the **second** number. Then use the addition rules.

$(+9) - (+12) = (+9) + (-12)$	$(+4) - (-3) = (+4) + (+3)$
$(-5) - (+3) = (-5) + (-3)$	$(-1) - (-5) = (-1) + (+5)$

Simplify. *Do not use a calculator for this section.*

1. $9 + -4 =$

7. $20 - -6 =$

2. $-8 + 7 =$

8. $7 - 10 =$

3. $-14 - 6 =$

9. $-6 - -7 =$

4. $-30 + -9 =$

10. $5 - 9 =$

5. $14 - 20 =$

11. $-8 - 7 =$

6. $-2 + 11 =$

12. $1 - -12 =$

Multiplying and Dividing Signed Numbers

If the signs are the same,
the answer is *positive*

If the signs are different,
the answer is *negative*

Like Signs	Different Signs
$(+)(+) = +$ $(+3)(+4) = +12$	$(+)(-) = -$ $(+2)(-3) = -6$
$(-)(-) = +$ $(-5)(-3) = +15$	$(-)(+) = -$ $(-7)(+1) = -7$
$(+)/(+) = +$ $(+3)/(+4) = +12$	$(+)/(-) = -$ $(+2)/(-3) = -6$
$(-)/(-) = +$ $(-3)/(-4) = +12$	$(-)/(+) = -$ $(-7)/(+1) = -7$

Simplify. *Do not use a calculator for this section.*

1. $(-5)(-3) =$

7. $\frac{-7}{-1} =$

2. $\frac{-6}{2} =$

8. $(3)(-4) =$

3. $(2)(4) =$

9. $\frac{8}{-4} =$

4. $\frac{-12}{-4} =$

10. $(-2)(7) =$

5. $(-1)(-5) =$

11. $\frac{-20}{-1} =$

6. $\frac{-16}{8} =$

12. $(2)(-5) =$

Rounding Numbers

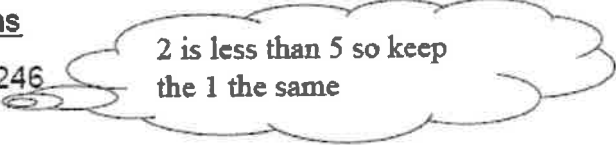
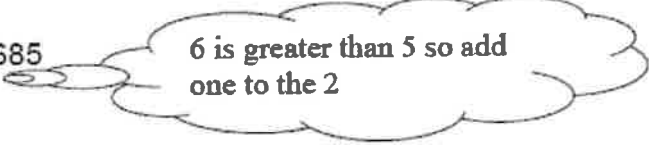
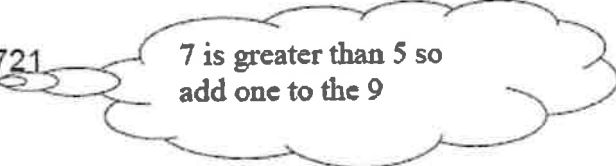
Step 1: Underline the place value in which you want to round.

Step 2: Look at the number to the right of that place value you want to round.

Step 3: If the number to the right of the place value you want to round is less than 5, keep the number the same and drop all other numbers.

If the number to the right of the place value you want to round is 5 or more, round up and drop the rest of the numbers.

Example: Round the following numbers to the tenths place.

<u>Tenths</u>											
1. 23. <u>1</u> 246		23.1									
2. 64. <u>2</u> 685		64.3									
3. 83. <u>9</u> 721		<table style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: right; padding-right: 5px;">83.9721</td> <td style="text-align: right; padding-right: 5px;">1</td> <td></td> </tr> <tr> <td style="text-align: right; padding-right: 5px;">+ 1</td> <td style="text-align: right; padding-right: 5px;">0</td> <td></td> </tr> <tr> <td style="border-top: 1px solid black; text-align: right; padding-top: 5px;">84.0</td> <td></td> <td style="text-align: right; padding-right: 5px;">84</td> </tr> </table>	83.9721	1		+ 1	0		84.0		84
83.9721	1										
+ 1	0										
84.0		84									

Round the following numbers to the tenths place.

- | | |
|------------------|-------------------|
| 1. 18.6231 _____ | 6. 0.2658 _____ |
| 2. 25.0543 _____ | 7. 100.9158 _____ |
| 3. 3.9215 _____ | 8. 19.9816 _____ |
| 4. 36.9913 _____ | 9. 17.1083 _____ |
| 5. 15.9199 _____ | 10. 0.6701 _____ |

Evaluating Expressions

Example

Evaluate the following expression when $x = 5$

Rewrite the expression substituting 5 for the x and simplify.

- a. $5x = 5(5) = 25$
- b. $-2x = -2(5) = -10$
- c. $x + 25 = 5 + 25 = 30$
- d. $5x - 15 = 5(5) - 15 = 25 - 15 = 10$
- e. $3x + 4 = 3(5) + 4 = 19$

Evaluate each expression given that: $x = 5$ $y = -4$ $z = 6$

1. $3x$

5. $y + 4$

2. $2x^2$

6. $5z - 6$

3. $3x^2 + y$

7. $xy + z$

4. $2(x + z) - y$

8. $2x + 3y - z$

Evaluate each expression given that: $x = 5$ $y = -4$ $z = 6$

9. $5x - (y + 2z)$

13. $5z + (y - x)$

10. $\frac{xy}{2}$

14. $2x^2 + 3$

11. $x^2 + y^2 + z^2$

15. $4x + 2y - z$

12. $2x(y + z)$

16. $\frac{yz}{2}$

Combining Like Terms

What is a **term**? The parts of an algebraic expression that are separated by an addition or subtraction sign are called **terms**.
The expression $4x + 2y - 3$ has 3 terms.

What are **like terms**? Terms with the same variable factors are called **like terms**.
 $2n$ and $3n$ are **like terms**, but $4x$ and $3y$ are **not like terms** because their variable factors x and y are different.

To simplify an expression, you must combine the like terms.

Examples:

Simplify

1. $5x + 8x$
 $5x + 8x = (5 + 8)x = 13x$

2. $3y - 6y$
 $3y - 6y = (3 - 6)y = -3y$

3. $3x + 4 - 2x + 3$
 $3x - 2x + 4 + 3 = (3 - 2)x + 4 + 3 = x + 7$

4. $2b + 5c + 3b - 6c$
 $2b + 3b + 5c - 6c = (2 + 3)b + (5 - 6)c = 5b - c$

Practice: Simplify each expression

1. $6n + 5n$

2. $25b + 15b$

3. $37z + 4z$

4. $x - 5x$

6. $3n + 1 - 2n + 8$

6. $4f + 5f - 6 + 8$

7. $7t + 9 - 4t + 3$

8. $2k + 4 - 8k - 1$

9. $4r + 3r + 6y - 2y$

10. $8g + 9h - 4g - 5h$

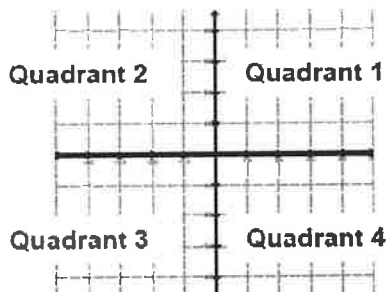
11. $2m + 3n - 4m + 5n$

12. $a + 5b - 2a + 9b$

Graphing

Points in a plane are named using 2 numbers, called a coordinate pair. The first number is called the x-coordinate. The x-coordinate is positive if the point is to the right of the origin and negative if the point is to the left of the origin. The second number is called the y-coordinate. The y-coordinate is positive if the point is above the origin and negative if the point is below the origin.

The x-y plane is divided into 4 quadrants (4 sections) as described below.

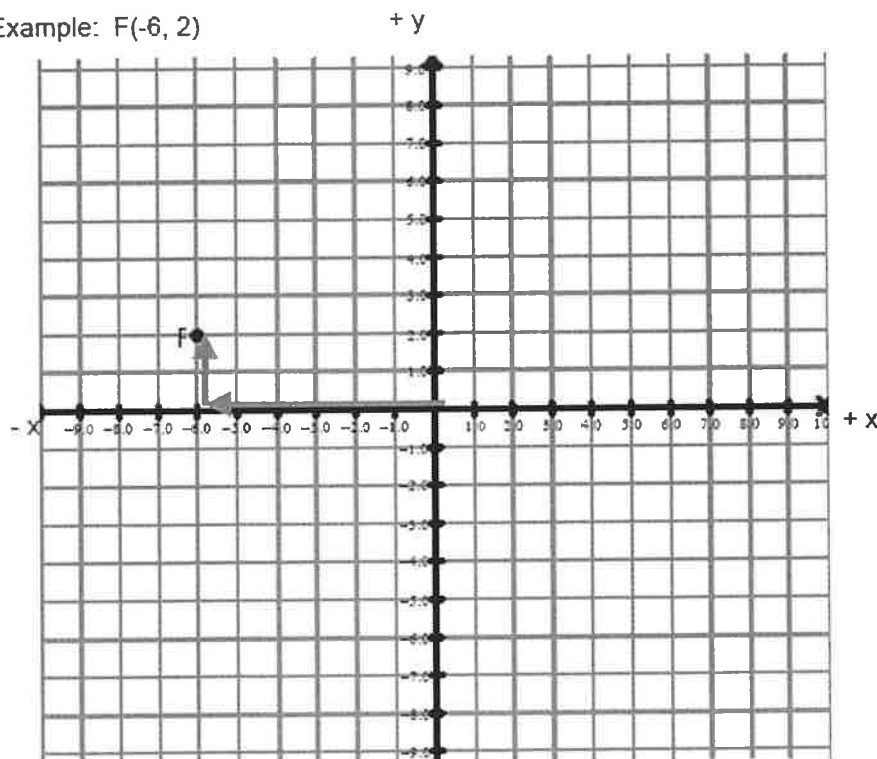


All points in Quadrant 1 has a **positive** x-coordinate and a **positive** y-coordinate (+ x, + y).
All points in Quadrant 2 has a **negative** x-coordinate and a **positive** y-coordinate (- x, + y).
All points in Quadrant 3 has a **negative** x-coordinate and a **negative** y-coordinate (- x, - y).
All points in Quadrant 4 has a **positive** x-coordinate and a **negative** y-coordinate (+ x, - y).

Plot each point on the graph below. Remember, coordinate pairs are labeled (x, y). Label each point on the graph with the letter given.

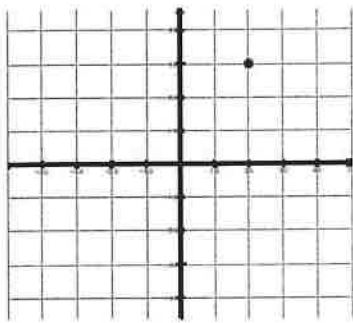
1. A(3, 4) 2. B(4, 0) 3. C(-4, 2) 4. D(-3, -1) 5. E(0, 7)

Example: F(-6, 2)

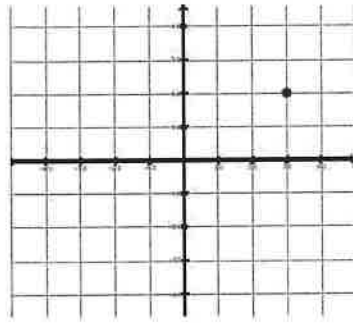


Determine the coordinates for each point below:

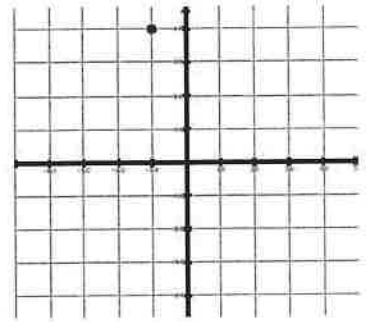
Example. (2, 3)



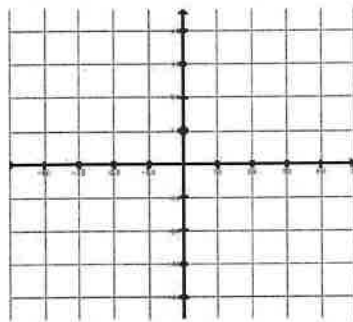
6. (__, __)



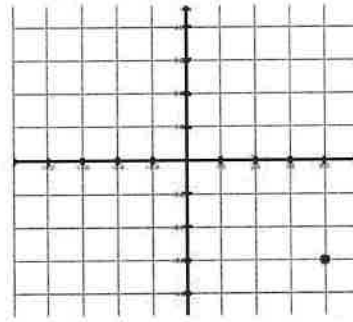
7. (__, __)



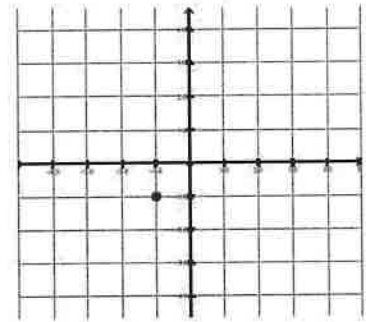
8. (__, __)



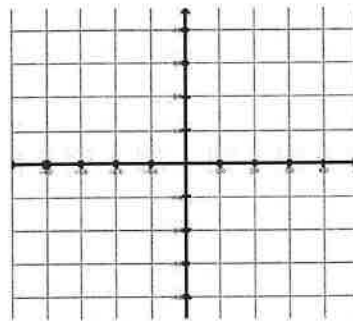
9. (__, __)



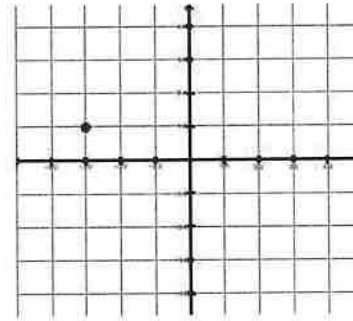
10. (__, __)



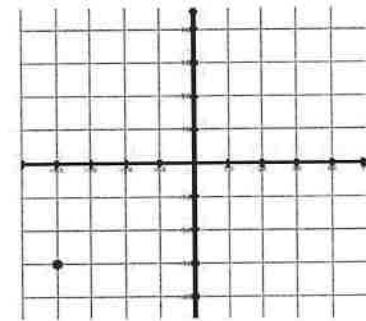
11. (__, __)



12. (__, __)



13. (__, __)



Complete the following tables. Then graph the data on the grid provided.

Example: $y = -2x - 3$

X	Y
-3	3
-2	1
-1	-1
0	-3

Work:

$$x = -3$$

$$y = -2(-3) - 3 = 6 - 3 = 3$$

$$\text{Therefore } (x, y) = (-3, 3)$$

$$x = -2$$

$$y = -2(-2) - 3 = 4 - 3 = 1$$

$$\text{Therefore } (x, y) = (-2, 1)$$

$$x = -1$$

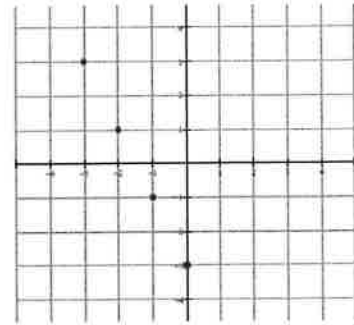
$$y = -2(-1) - 3 = 2 - 3 = -1$$

$$\text{Therefore } (x, y) = (-1, -1)$$

$$x = 0$$

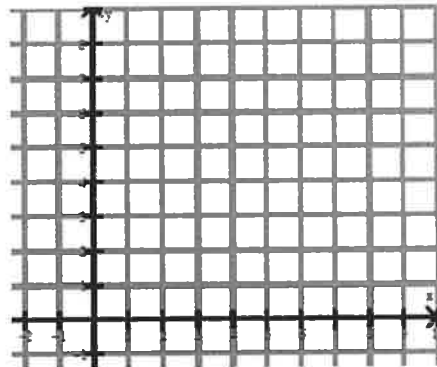
$$y = -2(0) - 3 = 0 - 3 = -3$$

$$\text{Therefore } (x, y) = (0, -3)$$



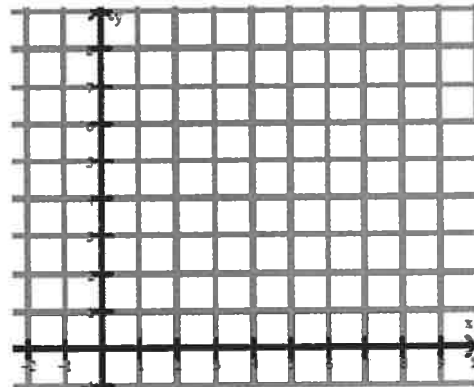
14. $y = x + 2$

X	Y
0	
1	
2	



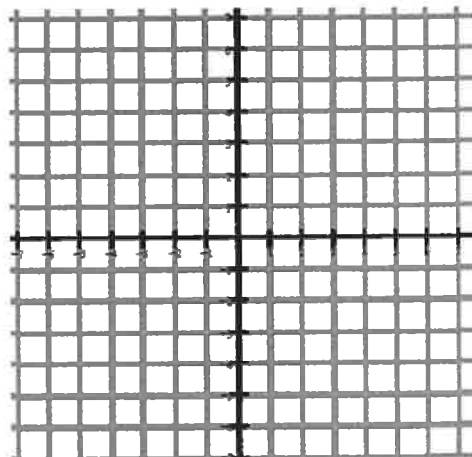
15. $y = 2x$

X	Y
0	
1	
2	
3	



16. $y = -x$

X	Y
-3	
-1	
1	
3	



Solving Equations

To solve an equation means to *find the value* of the variable. We solve equations by isolating the variable using opposite operations.

Example:

Solve.

$$\begin{array}{r} 3x - 2 = 10 \\ + 2 \quad + 2 \end{array}$$

$$\frac{3x}{3} = \frac{12}{3}$$

$$x = 4$$

Check your answer.

$$3(4) - 2 = 10$$

$$12 - 2 = 10$$

$$10 = 10$$

Isolate $3x$ by adding 2 to each side.

Simplify

Isolate x by dividing each side by 3.

Simplify

Substitute the value in for the variable.

Simplify

Is the equation true? If yes, you solved it correctly!

Opposite Operations:
Addition (+) & Subtraction (-)
Multiplication (x) & Division (\div)

Please remember...
to do the same step on
each side of the equation.

**Always check your
work by substitution!**

Try These:

Solve each equation below.

1. $x + 3 = 5$

2. $w - 4 = 10$

3. $c - 5 = -8$

4. $3p = 9$

5. $-7k = 14$

6. $-x = -17$

7. $\frac{h}{3} = 5$

8. $\frac{m}{8} = 7$

9. $\frac{4}{5}d = 12$

10. $\frac{3}{8}j = 6$