# Unit 1
## Integers

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Lesson 1
Order of Operations

AIM: I can evaluate an expression using order of operations.

Vocabulary
Operations ____________________________________________________________
Grouping Symbols _______________________________________________________
Exponents ______________________________________________________________

ORDER OF OPERATIONS

P ________________________________________________________________

E ________________________________________________________________

M/D ______________________________________________________________

A/S ______________________________________________________________
Examples: Simplify the following problems
1) 10 − 2 + 3  
2) (7 − 5) ∙ 6 + 4  
3) 15 − 6 ÷ 2 ∙ 3  
4) 27 ÷ 3 − 5

5) 10 − 3 ∙ (5 − 2)  
6) 3² + 4 ∙ 3  
7) 9 − 14 ÷ 2 + 3  
8) \( \frac{2 \cdot 6 + 3}{11 − 6} \)

Try These: Simplify the following problems
1) 5 − 2 + 7  
2) 2 + (3 − 2)  
3) 12 + 3 ∙ 2  
4) 2² − 12 ÷ 6 - 2

5) 24 ÷ 2 ∙ 6  
6) 10 + 8 ÷ 2  
7) (10 + 8) ÷ 2  
8) \( \frac{5 \cdot 6 + 2}{12 − 4} \)
Lesson 1 – Classwork/Homework

Simplify the following expressions:

1) $12 - 8 \div 2$
2) $(3 + 4) \div 7$
3) $(8 - 4) \div 2$

4) $6 \cdot (4 - 1) \div 2$
5) $4^2 + (5 - 2)^2$
6) $5^2 - 3^2$

7) $4^2 - 12 \div (4 - 2)$
8) $(2^3 - 2) \div 3 - 2$
9) $3 \cdot (5 - 2)$

10) $56 \div (7 \cdot 2) + 1$
11) $\frac{5 \cdot 4 + 2}{17 - 2 \cdot 3}$
12) $10 - 4 \cdot (3 - 1)$

13) $8 \div 4 + 2 \cdot 3$
14) $14 \div (7 - 5) \cdot 3$
15) $20 \div 4 + 3 \cdot 6 - 12$

Extended Response:
16) Sally was given the problem $3 + 5 \times 10$. Her answer to the problem was 80. Is this correct? If not, explain what she did wrong.
Lesson 2
Introduction to Integers

AIM: I can use integers to represent real life situations.

Warm Up:

Vocabulary

Integers: __________________________________________________________

Additive Inverse: ______________________________________________________

Absolute Value: ________________________________________________________

Part I: Introduction to Integers

Examples:

1) Plot the following integers on the number line:

[A] 3       [B] 5       [C] -4       [D] -1       [E] 0       [F] $\frac{-1}{2}$       [G] $\frac{3}{4}$
Inequality Symbols:

| Less than |
| Less than or equal to |
| Greater than |
| Greater than or equal to |
| Equal to |

Write an integer to represent each situation:

2) $5.00 off the original price

4) 8 yard gain

6) $25 deposit

8) 42 degrees below zero

10) $35 deficit

12) Compare using <, >, or = to make each inequality true:

[A] $-12 \bigg\leq \bigg\leq \bigg\leq 4$

[B] $-5 \bigg\leq \bigg\leq -6$

[C] $-10 \bigg\leq \bigg\leq 8$

[D] $\frac{3}{4} \bigg\leq \bigg\leq \frac{1}{3}$

[E] $-6 \bigg\leq \bigg\leq 6$

[F] $-7 \bigg\leq \bigg\leq -6$

[G] $-4 \bigg\leq \bigg\leq -5$

[H] $9 \bigg\leq \bigg\leq 9$

Order the following integers from least to greatest:

13) \{-3, -500, 43, 1, 0, -73, 300\}

14) \{0, -20, 50, 3, 37, -25, 1000\}

Name the additive inverse of each integer:

15) -7

16) 23

17) 0
PART II: Absolute Value

Absolute Value Rules:

1) Absolute value represents the _________________ from zero.

2) Absolute value will ________________ be a ______________ number.

3) Treat the absolute value symbol as parentheses. You must do what is ________________!!!

Examples:

1) What is the distance from −3 to 0?  
2) What is the absolute value of −3?

3) What is the distance from 3 to 0?  
4) What is the absolute value of 3?

5) |−5|  
6) |9|  
7) |−1|  
8) |−100|  
9) |400 − 100|

10) |−3| + |−1|  
11) |−1| + |−3|  
12) |3 − 1|  
13) |3| + |−1|
Try These:
14) Which of the following is the largest integer?
   a) -300   b) 1   c) 250   d) 0

15) What is the absolute value of 0?

16) The temperature in Alaska at noon is -12°. Use the number line to answer the following questions

   [A] How many degrees warmer is -9°?
   [B] How many degrees colder is -15°?
   [C] At midnight, the temperature had dropped 5°. What is the temperature now?
   [D] How many degrees would the temperature at noon have to increase to get to 0°?

Lesson 2 – Classwork/Homework

Write an integer for each situation.

1) 6-yard loss   2) 8-yard gain   3) $5 off the original price
4) 2° above zero   5) Loss of 15 pounds   6) $35 withdrawal
7) $75 deposit   8) 1 mile above sea level   9) 20 ft. below sea level
10) A stock opened at $7 per share on Monday.

[A] The stock’s value increased $3 on Monday. What is the value now?

[B] On Tuesday, the value of the stock decreased by $5. What is the stock’s value now?

[C] By the end of the week, the value of the stock decreased by $9 from its original value. What is the value at closing on Friday? Use a number line to justify your answer.

Compare using <, >, or = to make each inequality true:

11) \(-3\) \(\bigcirc\) \(-4\)  
12) \(-7\) \(\bigcirc\) 10  
13) \(-1\) \(\bigcirc\) \(-15\)  
14) \(-9\) \(\bigcirc\) \(-10\)  
15) 5 \(\bigcirc\) \(-7\)  
16) \(-12.9\) \(\bigcirc\) \(-12.6\)

Order the integers in each set from least to greatest.

17) \(-3, 5, -7, -2, 0\)  
18) \(5, 400, -400, -350, -35\)

Name the additive inverse of each integer:

19) \(-7\)  
20) 23  
21) \(-400\)  
22) \(-1\)  
23) 3

24) The absolute value of two numbers that are additive inverses will \underline{________} be the same.

a) always  
b) sometimes  
c) never
Compare using $<$, $>$, or $=$ to make each inequality true.

25) $|-12| \bigcirc 4$  
26) $|-5| \bigcirc |-6|$  
27) $|-10| \bigcirc 10$  
28) $|15-4| \bigcirc -13$

29) $|-6| \bigcirc |6|$  
30) $|-7| \bigcirc -6$  
31) $|-4| \bigcirc |-5|$  
32) $9 \bigcirc |10-1|$

Order the integers in each set from least to greatest.

33) $\{-3, 4, |-2|, 5, 0\}$

34) $\{-1, -4, |-4|, 0, 5\}$

Evaluate

35) $|5-3|$  
36) $|6-2|$

37) $|-3| + |-3|$  
38) $|0-7|$

39) $-|6| + 9$  
40) $|12| - 3 + |0|$

CHALLENGE

Decide if each of the following is always true, sometimes true, or never true for all integer values of $x$.

[a] $|x| = x$  
[b] $|-x| = x$  
[c] $-|x| = x$  
[d] $|x| = |-x|$
Lesson 3
Adding Integers

AIM: I can add positive and negative numbers.

Warm Up:

Vocabulary
Sum: __________________________________________________________________________

Commutative Property: __________________________________________________________________________

Addition with a number line:

For Example:

1) \(-1 + 3\) 

Steps: 1. Start at -1 on the number line
2. Move 3 spaces in the positive direction

2) \(-1 + (-3)\)

Steps: 1. Start at -1 on the number line
2. Move 3 spaces in the negative direction

Alternate Method:

<table>
<thead>
<tr>
<th>Same Signs</th>
<th>Different Signs</th>
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<tbody>
<tr>
<td>Add and Keep</td>
<td>Subtract and Keep the sign of the larger number</td>
</tr>
</tbody>
</table>

Examples:

1) \(5 + 2\)  
2) \(-2 + (-9)\)  
3) \(-8 + 1\)  
4) \(6 + (-4)\)  
5) \(6 + (-8)\)
6) $-9 + (-9)$  
7) $-5 + 5$  
8) $-6 + 3$  
9) $-1 + -2 + 8$  
10) $12 + (-6) + (-8)$  

Try These:

1) $-2 + 4$  
2) $-5 + (3)$  
3) $-2 + (-5)$  
4) $-3 + (7)$  
5) $-6 + 7$  

6) $-3 + -4 + 4$  
7) $-5 + (-1) + 6$  
8) $2 + (-5) + 5$  
9) $-3 + (7) + 3$  
10) $-7 + -7 + 7$  

Adding Larger Integers:

**KEEP IN MIND:** If you are adding a positive, the number should get bigger (move in positive direction)
If you are adding a negative, the number should get smaller (move in negative direction)

1) $-30 + 20$  
2) $40 + -10$  
3) $73 + (-13)$  
4) $-120 + 20$  

5) $-120 + (-20)$  
6) $-47 + (-3)$  
7) $-78 + 80$  
8) $38 + (-24) + 14$

9) The temperature in Vermont is recorded at $-12^\circ$. At the same time, the temperature in New York is $15^\circ$ warmer. What is the temperature in New York?
### More Examples:

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<td>10</td>
<td>5 + (−9)</td>
<td>11</td>
<td>−2 + 7</td>
<td>12</td>
</tr>
<tr>
<td>15</td>
<td>−12 + (−8)</td>
<td>16</td>
<td>−44 + 14</td>
<td>17</td>
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<tr>
<td>20</td>
<td>−3 + (−4)</td>
<td>21</td>
<td>−10 + 80</td>
<td>22</td>
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### Review (Multiple Choice):

25) Which of the following integers represents the greatest negative integer?
   a) −4  
   b) −1  
   c) 400  
   d) −400

26) Which of the following integers represents the distance from -3 to 5?
   a) 5  
   b) 2  
   c) 8  
   d) −8

27) What is the absolute value of -7?
   a) 7  
   b) −7  
   c) 14  
   d) −14
Lesson 3 – Classwork/ Homework

1) \(-2 + -4\)  
2) \(2 + 10\)  
3) \(-7 + 8\)

4) \(12 + (-4)\)  
5) \(-17 + 10\)  
6) \(-11 + -4\)

7) \(-15 + 10\)  
8) \(20 + (-8)\)  
9) \(-5 + (-5)\)

10) \(8 + (-4) + 6\)  
11) \(-3 + -6 + 4\)  
12) \(-2 + -1 + -9\)

13) \(8 + (-10) + 2 + (-5)\)  
14) \(12 + (-26) + 4 + 26\)  
15) \(12 + (-12) + 47\)

16) A submarine is 350 feet below sea level, over the course of the next three hours, the submarine rose 120 feet. What is the submarine’s distance below sea level?

17) An elevator starts on the ground floor. If it goes up 3 floors, then down 2 floors, and finally up 6 floors, what floor is it on?

18) The sum of \(-7\) and what number is 2?

19) The temperature in city A is \(-35^\circ\). If the temperature in city B is the additive inverse of \(-35^\circ\), how much warmer is city B?
Lesson 4
Subtracting Integers

AIM: I can subtract positive and negative numbers.

Warm Up:

Vocabulary

Difference: ___________________________________________

Subtraction with a number line:

To subtract an integer, add its opposite (inverse)

\[ a - b = a + (-b) \]

or

\[ a - (-b) = a + (b) \]

For Example:

1) \(-1 - 3\)  
   Steps: 1. Start at \(-1\) on the number line  
          2. Move 3 spaces to the ______

2) \(-1 - (-3)\)  
   Steps: 1. Re-write the problem using addition  
          2. Start at \(-1\) on the number line  
          3. Move 3 spaces to the ______
Alternate Method:

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</table>

Examples:

1) \(-2 - 4\)  
2) \(5 - (-3)\)  
3) \(-2 - (-5)\)  
4) \(-3 - (7)\)  
5) \(-6 - 7\)  

6) \(-3 - (-4) - 4\)  
7) \(-5 - (-1) + 6\)  
8) \(2 - (-5) - 5\)  
9) \(-3 - (4) + 3\)  
10) \(-12 - (-12)\)  

12) The temperature in Chicago is 38°. It is 40° colder in North Dakota. What is the temperature in North Dakota?

13) The temperature in Maine is \(-21°\). At the same time, the temperature in Texas is 79°. What is the difference in the two temperatures?

**KEEP IN MIND:** When you subtract a negative you are really adding. **\((-10) = +10\)**

Try These:

14) \(-30 - 20\)  
15) \(40 - (-10)\)  
16) \(73 - (-13)\)  
17) \(-120 - 20\)  

18) \(-120 - (-20)\)  
19) \(-47 - (-3)\)  
20) \(-78 - 80\)  
21) \(38 - (-24) + 14\)
22) The temperature in San Jose is recorded at 82°. At the same time, the temperature in Seattle is 95° colder. What is the temperature in Seattle? (Draw a picture of a thermometer to help.)

23) The temperature in Michigan is −6°. At the same time, the temperature in New Mexico is 94°. What is the difference in the two temperatures? (Draw a picture of a thermometer to help.)

24) Michael is 8 years old. His sister Anna is 7 years older than him, and his brother Rocco is 11 years younger than his sister. How old is his brother?

Lesson 4 – Classwork/ Homework

1) $-4 - 5$  
2) $5 - (-3)$  
3) $-9 - 2$

4) $-10 - (-5)$  
5) $-12 - (-3)$  
6) $8 - 4$

7) $7 - 10$  
8) $-15 - (-1)$  
9) $20 - 32$
10) \(-9 - (-6)\)  
11) \(-3 - 5 + 8\)  
12) \(-3 - 3 - 3\)

13) Write \(8 - 2\) as many ways as you can.

1) ____________
2) ____________
3) ____________

Can you think of anymore?

14) Your friend is having trouble simplifying \(20 - (-38)\). Write an explanation to help your friend solve the problem.
__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________

15) Ryan has $75 in his bank account. He withdraws $48, and then deposits $12. What is Ryan’s new balance?

**Review: Show ALL Work**

16) \(-|3| + |4|\)  
17) \(|-4| + |3|\)  
18) \(|-4 + 3|\)  
19) \(|-a|\)
Lesson 5
Mixed Adding and Subtracting Integers

AIM: I can add and subtract positive and negative numbers.

Warm Up:

Vocabulary Review
Sum: __________________________________________________________________________
Difference: _____________________________________________________________________
Additive Inverse: __________________________________________________________________

Examples - Use the commutative property and the inverse property to simplify:
1) 30 + 45 + (−30) 2) −53 + 7 + 53 3) 125 + (−73) + 125 + 73
4) 21 + 47 + (−47) + (−4) 5) 34 + 21 + (−34) 6) \( \left( \frac{-5}{8} \right) + (−72) + \left( \frac{5}{8} \right) \)
7) 83 + (−83) + 27 + (−27) 8) −20 + 30 + (−20) + 90 9) 432 + 68 + 11 + (−500)
Try These:

1) \( 3 + 10 \)  
2) \(-7 + 5\)  
3) \(-5 - 6\)

4) \(8 + (-4)\)  
5) \(-15 + 2\)  
6) \(-8 - 8 - 8\)

7) \(18 - 9\)  
8) \(25 + (-13)\)  
9) \(-6 + (-6)\)

10) \(-7 + 12\)  
11) \(-16 + 16\)  
12) \(-12 + 7 + (-5)\)

13) \(9 + (-15) + 3 + (-5)\)  
14) \(14 + (-26) + (-13) + 7\)  
15) \(15 - (-2) + 2\)
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<td>2)</td>
<td>−7 + (−8)</td>
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<td>3)</td>
<td>−6 + 5</td>
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<td>4)</td>
<td>−2 + 14</td>
<td>5)</td>
<td>−7 − 6</td>
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<td>−30 + (−30)</td>
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<td>22)</td>
<td>−15 + 16</td>
<td>23)</td>
<td>18 + (−10) + 3 − (−5)</td>
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<td>24)</td>
<td></td>
<td>24)</td>
<td>−11 + −3</td>
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<tr>
<td>25)</td>
<td>−5 − 6 − 7 − 8</td>
<td>26)</td>
<td>−13 + −6 + 8</td>
</tr>
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<td>27)</td>
<td></td>
<td>27)</td>
<td>−70 −10 + −9</td>
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Lesson 6
Multiplying and Dividing Integers

AIM: I can identify when a product or quotient will be positive or negative.

Warm Up:

Vocabulary
Product: __________________________________________________________________________

Quotient: _________________________________________________________________________

Multiplicative Inverse: __________________________________________________________________

Undefined: _________________________________________________________________________

Rules:

1) Count the negative signs
   - Odd number of negative signs - Answer Negative
   - Even number of negative signs - Answer Positive

2) Multiply or Divide

Any number multiplied by zero is _______

Any number divided by zero is ___________

Examples:

1) \(-5 \cdot -2\)  
2) \(-8 \cdot 4\)  
3) \(8 \cdot -4\)  
4) \(-25 \div 5\)  
5) \(25 \div -5\)

6) \((7)(0)\)  
7) \(\frac{8}{0}\)  
8) \(\frac{-24}{8}\)  
9) \((-1)^4\)  
10) \(-1 \cdot -3 \cdot -4 \cdot 2\)
Try These

1) \(-15 \cdot -2\)  
2) \((-3)(10)\)  
3) \(56 \div -7\)

4) \(-2 \cdot 1 \cdot -3\)  
5) \(-2 \cdot -6 \cdot 2 \cdot -1\)  
6) \((-1)^3\)

7) \((-1)^{246}\)  
8) \(\frac{-81}{-9}\)  
9) \(-12 \div -4\)

10) \(\frac{28}{-7}\)  
11) \(-2 (-3)\)  
12) \(-5 \cdot 5 \cdot 2\)

---

Lesson 6 – Classwork/ Homework

Multiply:

1) \((-4)(3)\)  
2) \((-5)(-8)\)  
3) \(-5 \cdot 7\)

4) \(16(-3)\)  
5) \((-50)(-2)\)  
6) \((-12)(-1)\)

7) \((-9)(-8)\)  
8) \((-15)(-3)\)  
9) \((16)(-4)\)
10) \((-3)(-1)\)  
11) \((-1)(-1)(-1)\)  
12) \(-8 \cdot 0 \cdot 2\)

**Divide:**

13) \(35 \div -5\)  
14) \(\frac{16}{-4}\)  
15) \(\frac{-20}{-5}\)

16) \(-21 \div 7\)  
17) \(\frac{(-8)}{0}\)  
18) \(\frac{(-32)}{8}\)

19) \(270 \div (-90)\)  
20) \(-55 \div 11\)  
21) \(\frac{400}{-200}\)

22) An oil rig is drilling into the ground at a rate of 7 feet per minute. What integer represents the position of the oil rig after 22 minutes?

23) Monica has 100 shares of stock worth $8 each. If the price drops $3 per share, what integer represents the change of Monica’s investment?

**Review: Show All Work**

24) \(6 + (-12)\)  
25) \(-25 + (-7)\)  
26) \(40 - (-20)\)
Lesson 7
Evaluating Expressions

AIM: I can substitute numbers for variables and simplify using the order of operations.

Warm Up:

Vocabulary

Algebraic Expression: ____________________________

Variable: _______________________________________

Evaluate: _______________________________________

Substitution Property: ___________________________

Steps:

1) Write the original problem.
2) Rewrite the expression with the values of each variable substituted in parentheses.
3) Simplify by using order of operations. (SHOW ALL WORK)

Examples: Evaluate each expression if n = 4, p = 3, and t = 6

1) 3n + p  
2) \( t^2 - 2p \)  
3) 3p - n + 4  
4) \( \frac{npt}{3} \)

5) -6.1p  
6) 1.5(p + n)  
7) 4n + 3p - 2t  
8) 12 ÷ 3n + p
Try These: Evaluate each expression if \( n = 2, \ p = -4 \) and \( t = 3 \)

1) \( 5n + p \)  
2) \( -2.4t \)  
3) \( 3(p - n) + 4 \)  
4) \( p \div (t - 1) \)

5) \( \frac{p + n}{t} \)  
6) \( n - p + t \)  
7) \( \frac{p^2 + 4}{3t + 1} \)  
8) \( p - n^5 \)

Use the given formula to evaluate:

9) Drew drove to Chicago at an average rate of 50 mph. The trip took him 17 hours. How far did Drew drive?

\[
\text{Distance} = \text{Rate} \times \text{Time}
\]

Lesson 7 – Classwork/Homework

Evaluate each expression if \( x = 2, \ y = 3 \) and \( z = 5 \)

1) \( 2x + z \)  
2) \( z - 2x \)  
3) \( 3x - y + 3 \)  
4) \( \frac{5xy}{z} \)

5) \( (xy)^2 \)  
6) \( 3x^2 \)  
7) \( \frac{x^2 + 4}{3y - 5} \)  
8) \( 6x^2 - z \)
USE THE GIVEN FORMULA TO EVALUATE:

9) John is deciding whether he wants to install a rectangular pool or a cylindrical pool in his back yard. The pool company shows him two models, one a rectangular prism and one a cylinder, that are the same price. He wants to determine which pool would hold a larger volume of water.

   [a] The rectangular prism pool has a width of 10 feet, a length of 20 feet, and a height of 5 feet. Using the formula for volume of a rectangular prism, determine the volume of this model.

   \[ V = lwh \]

   [b] The cylindrical pool has a radius of 10 feet, and a height of 4 feet. Using the formula for volume of a cylinder, estimate the volume of this model. (use 3 as an estimate for \( \pi \) at the very end of the problem)

   \[ V = \pi r^2 h \]

   [c] Which pool has a greater volume? By how much?

10) A rectangular prism has a length of 5 inches, a width of 3 inches and a height of 7 inches. Find the surface area of the rectangular prism.

   \[ Surface\ Area = 2lw + 2lh + 2wh \]
Lesson 8
Word Problems

**AIM:** I can solve word problems using expressions.

**Warm Up:**

1) One night in January, the temperature in Alaska is $-16^\circ F$. The next day, the temperature is half of what it was the night before. What is the temperature?

2) During the fourth quarter, the Patriots were penalized 3 times for the same amount for a total of 45 yards. Write a division sentence to represent this equation. Then find the number of yards for each penalty.

3) Joey owes his friend $10. He pays back $4, and then borrows another $17. How much money does Joey owe his friend?

4) A submarine is 800 feet below sea level. Over the course of the next few hours, the submarine ascends 200 feet, descends 400 feet, ascends 200 feet and descends 900 feet. How far below sea level is the submarine?
5) The temperature at midnight is recorded at -11°. Over the next ten hours, the temperature increased 13°. What is the temperature after this ten hour period?

6) An elevator started on the 9th floor goes up 2 floors, then down 5 floors, then up 3 floors, then down 6 floors. On what floor is the elevator now?

7) The temperature in Anchorage, Alaska is recorded at -17°. At the same time, the temperature in Los Angeles, California is 97° warmer than in Anchorage. What is the temperature in Los Angeles?

8) In Buffalo, New York, the temperature was -14°F in the morning. If the temperature dropped 7°F at 12:00pm, what is the temperature now?

9) A submarine was situated 750 feet below sea level. If it descends (goes down) 200 feet, what is its new position?

10) A submarine was situated 800 feet below sea level. If it ascends (goes up) 50 feet per hour, what is its new position after 5 hours?
Lesson 8 – Classwork/ Homework

1) Maggie deposits $35 in the bank. She then withdraws $10 on Monday, deposits $15 on Tuesday, and then withdraws $14 on Wednesday. How much does Maggie have left in the bank?

2) A submarine was situated 450 feet below sea level. If it descends (goes down) 300 feet, what is its new position?

3) A stock opens at $450 per share on Monday. The chart displays the change over the course of the next few days. What is the value of the stock per share at closing on Friday?

<table>
<thead>
<tr>
<th>Day</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>+$21</td>
</tr>
<tr>
<td>Tuesday</td>
<td>-$13</td>
</tr>
<tr>
<td>Wednesday</td>
<td>-$8</td>
</tr>
<tr>
<td>Thursday</td>
<td>+$15</td>
</tr>
<tr>
<td>Friday</td>
<td>-$6</td>
</tr>
</tbody>
</table>

4) In the Sahara Desert one day it was 136°F. In the Gobi Desert a temperature of -50°F was recorded. What is the difference between these two temperatures?

5) Mt. Everest, the highest elevation in Asia, is 20,320 feet above sea level. The Dead Sea, the lowest elevation, is 282 below sea level. What is the difference between these two elevations?

6) A runner jogs 14 miles in one direction. He then turns around and jogs 18 miles in the opposite direction.

   [a] How far is the runner from his starting position?

   [b] How far did the runner jog in total?
7) A scuba diver is 180 feet below sea level. She ascends 32 feet, and then descends 48 feet. What is her current depth?

8) An explorer jumps out of a plane and parachutes into a cave. He jumped out of the plane at 300 feet above sea level, and lands at the bottom of the cave, which is 900 feet below sea level.

[a] How far was the explorer’s jump?

[b] Once in the cave, the explorer continues deeper into the cave. If he climbs to the lowest point in the cave, and records the depth at 1524 feet below sea level, how far down did he climb from where he landed?

9) A roller coaster at Six Flags has a largest drop of -276 feet. A roller coaster at Dorney Park has a largest drop of -239 feet. How much bigger is the drop at the roller coaster at Six Flags?

10) The Volunteer Club raked leaves at several senior citizens’ homes in the neighborhood. If each group of three students could remove 8 cubic meters of leaves in one hour, find an integer to represent the number of cubic meters of leaves 12 students could remove in 3 hours?
**MATCHING:**

<p>| | | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

- 1) Integer
- 2) Operations
- 3) Commutative Property
- 4) Inverse
- 5) Expression

**SIMPLIFY: NO CALCULATOR**

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<table>
<thead>
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<tbody>
<tr>
<td>6</td>
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<td>20</td>
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<tr>
<td>21</td>
<td>22</td>
<td>23</td>
</tr>
</tbody>
</table>

- a. States that $a + b = b + a$
- b. Addition, subtraction, multiplication, and division
- c. Negative opposite
- d. A mathematical sentence with no equal sign
- e. The set of whole numbers and their negative opposites
24) $-9$
25) $14$
26) $-40$
27) $-10$
28) $100$

29) $|-4| + |-1|$
30) $|-4 - 1|$
31) $|3 - 1|$
32) $|3| + |-1|$

**COMPARE:**
33) $|-5| igcirc 4$
34) $|6| igcirc |-6|$
35) $|-11| igcirc 10$
36) $|13| igcirc -13$

**REPRESENT EACH SITUATION AS AN INTEGER:**
37) $10$ withdrawal ______
38) $20$ yard gain ______
39) $8^\circ$ temperature drop____
40) $15$ deposit _____

**EVALUATE THE FOLLOWING IF:** $x = 3$, $y = 4$, and $z = -2$
41) $2y - 2x$
42) $y^2$
43) $1.3xz$
44) $y + z$

45) An elevator begins on the $4^{th}$ floor and goes up 2 floors and then down 3 floors. What floor is the elevator on?

46) The temperature was $20^\circ$ at noon. The temperature dropped at a rate of $8^\circ$ per hour. What is the temperature at 3:00 pm? Show all work.

47) Find the difference between $37^\circ$ and $-12^\circ$. Prove your answer on a number line.
48) Order from least to greatest {20, −12, −30, 0, 26, −15}

49) John travels for 3 miles at an average speed of 40 mph, how far does he travel in this 3 hour span?

Distance = Rate • Time

50) A school policy requires that there be at least one chaperone for every 6 students on a field trip. How many chaperones are required for a field trip with 42 students?

51) What is the name of the answer to an

Addition problem: ____________
Subtraction problem: __________
Multiplication problem: __________
Division problem: __________

52) The temperature on Monday morning was -12° using the chart determine what the temperature is Friday evening.

<table>
<thead>
<tr>
<th>Day</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>-6</td>
</tr>
<tr>
<td>Tuesday</td>
<td>3</td>
</tr>
<tr>
<td>Wednesday</td>
<td>4</td>
</tr>
<tr>
<td>Thursday</td>
<td>-2</td>
</tr>
<tr>
<td>Friday</td>
<td>-3</td>
</tr>
</tbody>
</table>
UNIT 2
FRACTIONS AND DECIMALS
USING THE CALCULATOR

<table>
<thead>
<tr>
<th>Date</th>
<th>Lesson</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to Decimals/ Adding, Subtracting, Multiplying, &amp; Dividing Decimals with Integers</td>
</tr>
<tr>
<td>2</td>
<td>Using the Calculator/ Adding and Subtracting Fractions with Integers Multiplying and Dividing Fractions with Integers/ Dividing Complex Fractions</td>
</tr>
<tr>
<td>3</td>
<td>Converting Rational Numbers to Decimals/ Comparing and Ordering Rational Numbers</td>
</tr>
</tbody>
</table>
Lesson 1
Add, Subtract, Multiply, Divide Decimals with Integers

Aim: I can round, add, subtract, multiply, divide decimals and fractions with integers

Warm Up:

**PlACES**

**Fill in the place value in the appropriate space:**

```
  9 , 3 4 0 . 2 3 9 8
```

**Rounding**

Round the following decimals to the nearest tenth:

8. 3.19  9. 4.921  10. 5.909  11. 89.985  12. 12.487

Round the following decimals to the nearest hundredth:

13. 3.297  14. 8.9294  15. 75.989  16. 8.495  17. 18.783

Round the following decimals to the nearest thousandth:

18. 3.2978  19. 2.4234  20. 52.0091  21. 18.1236  22. 21.7253
Adding/Subtracting Decimals:

Rules:
1) Line up the decimals
2) Add or subtract

Find the Sum or Difference (Round to the tenths):

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3</td>
<td>0.13</td>
<td>93.95</td>
</tr>
<tr>
<td>1) + 0.4</td>
<td>2) + 3.87</td>
<td>3) - 45.2</td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>49.2 + 5.63</td>
<td>5) 9.4 - 4.08</td>
<td>6) 16.2 - (-24.9)</td>
</tr>
</tbody>
</table>

Multiplying Decimals:

Rules:
1) Ignore the decimals in the numbers
2) Multiple the given numbers as if they were whole numbers
3) Count the places after the decimal in each number
4) Count that number of places from the right side in your answer

Find each product (Round to the nearest tenths):

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1.02</td>
<td>2) 58</td>
<td>3) - 4.15</td>
</tr>
<tr>
<td>x 3.6</td>
<td>x - 2.1</td>
<td>x - 2.6</td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>-8.7(0.45)</td>
<td>5) (12.15)(3.5)</td>
<td>6) (-0.91)(-2.7)</td>
</tr>
</tbody>
</table>

7) An apple costs $.60. How much will it cost to purchase a dozen apples?
Dividing Decimals:
Rules:
1) Rewrite each division problem as long division.
2) Do not start dividing until you change the outside number to a whole number.
3) Move the inside decimal the same amount of places as you did the outside number.
4) Write the decimal up into the answer.
5) Divide the two numbers as whole numbers to find the quotient.

Find each quotient (Round to the nearest tenths):

1) $7.74 \div 1.8$
2) $19.2 \div 3.2$
3) $83.7 \div 2.7$

Word Problems:
4) Peanuts costs $1.75 per jar. How many jars can you buy with $14?


6) After digging up lilac bushes in a garden, a landscape architect uses sod to cover the ground. The sod costs $2.25 per yard. He pays $31.50. How much sod does he buy?

7) A car travels 360.25 miles. It uses 13.1 gallons of gas. How much miles per gallon of gas does the car travel?
Lesson 1 – Homework

Breakfast Menu

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egg</td>
<td>$1.75</td>
</tr>
<tr>
<td>Toast</td>
<td>$0.99</td>
</tr>
<tr>
<td>Bacon</td>
<td>$0.50</td>
</tr>
<tr>
<td>Milk</td>
<td>$2.25</td>
</tr>
</tbody>
</table>

1) Michelle wants to order 2 eggs with bacon. How much will it cost?

2) A family orders 4 eggs, milk, and 2 pieces of bacon. How much will it cost?

3) a) If Michael orders 1 egg, toast, bacon, and milk, how much will it cost?

   b) Michael gives a $10 bill to the cashier. How much change will he receive?

4) 1.02 ⋅ 6.9 = 7038

5) 0.6 ⋅ 9.312 = –55872

6) Each trip on a ride at a carnival costs $1.25. If Tara goes on 4 rides, how much will it cost her?

7) Alicia paid $1.32 for a bag of potato chips. The chips cost $0.55 per pound. How much does the bag of potato chips weigh?

8) Nina and three friends ate lunch at a café. They decided to split the bill evenly. The total bill was $17.84. How much was each person’s share?

9) You buy five movie tickets for a total of $23.75. Your friend gives you $5 for one of the tickets. How much change should you give your friend?
Lesson 2
Add, Subtract, Multiply and Divide Fractions and mixed numbers with integers

Aim: I can add, subtract, multiply and divide fractions and mixed numbers with integers.

Warm Up:

Introduction to Calculator Fractions and Decimals

How to input fractions into the calculator

You must use the \( \frac{a}{b} \) button!

Use \((-)\) if you need to make a number negative.

- Simple fractions such as \( \frac{1}{2} \) are entered as:
  \[
  \frac{1}{2}
  \]

- Mixed numbers such as \(-1 \frac{1}{2}\) are entered as:
  \[
  (-) \quad 1 \quad \frac{a}{b} \quad 1 \quad \frac{a}{b} \quad 2
  \]

- To change a mixed number to an improper fraction:

  \[
  \text{Shift} \quad \frac{a}{b}
  \]

Example 1: \( \frac{1}{4} + \frac{2}{3} = \)

Enter the following:
\[
1 \quad \frac{a}{b} \quad 4 \quad + \quad 2 \quad \frac{a}{b} \quad 3
\]

TRY IT!! The correct answer is______________
Example 2: \(1 \frac{3}{4} + 2 \frac{1}{3} = \)

Enter the following: \[
\begin{array}{cccc}
1 & a_{b} & \frac{b}{c} & 3 & a_{b} & \frac{b}{c} & 4 & + & 2 & a_{b} & \frac{b}{c} & 1 & a_{b} & \frac{b}{c} & 3
\end{array}
\]

TRY IT!! The correct answer is _________

Solve the following using your calculator.

1) \(\frac{1}{6} + \frac{2}{3} = \)  
2) \(0.98 - 6.3 = \)  
3) \(5 \frac{1}{4} - 2 \frac{2}{3} = \)

4) \(9.65 \times 78.54 = \)  
5) \(\frac{3}{10} ÷ 4 \frac{1}{3} = \)  
6) \(9 \frac{1}{8} \times 2 \frac{2}{5} = \)

Convert the following into a mixed number using your calculator.

7) \(\frac{16}{6} = \)  
8) \(-\frac{223}{5} = \)  
9) \(-\frac{654}{25} = \)

Convert the following into an improper fraction using your calculator.

10) \(2 \frac{1}{7} = \)  
11) \(-8 \frac{5}{14} = \)  
12) \(-22 \frac{4}{5} = \)

Review

Numerator: __________________________________________________________

Denominator: __________________________________________________________

Mixed Number: __________________________________________________________

Improper Fraction: _______________________________________________________
Add/Subtract Fractions

Rules:
1) Find a common denominator
2) Add or subtract numerators
3) Keep the denominator the same
4) Simplify fraction into lowest terms

Examples:

1) \( \frac{1}{8} + \frac{5}{8} \)  
2) \( \frac{7}{10} - (-\frac{1}{10}) \)  
3) \( 7\frac{2}{3} - 1\frac{1}{6} \)

4) \( \frac{1}{7} + \frac{5}{9} \)  
5) \( 16\frac{2}{9} + 1\frac{7}{10} \)  
6) \( -6\frac{2}{5} + 1\frac{4}{5} \)

7) To make lemonade, you use 3\( \frac{1}{3} \) cups of lemon concentrate and 1\( \frac{1}{3} \) cups of water. How many cups of lemonade do you make?

8) You have 4 cups of flour and you need to use 1\( \frac{3}{4} \) cups of flour for a cookie recipe. How much flour will you have left?

9) Mark drives his car 37\( \frac{1}{2} \) miles west on the Long Island Expressway, however he drove past his exit. He turns around and goes east for 4\( \frac{1}{3} \) miles to his exit. Had he not missed his exit, how far would Mark have had to travel on the highway?

10) Jessica’s car has a gas tank that holds 18\( \frac{3}{5} \) gallons of gas. Jessica knows that the tank only has 3\( \frac{1}{3} \) gallons of gas left in it. How much gas would it take to fill up the gas tank?
Important Vocabulary:
Reciprocal: _______________________________________________

Multiplying Fractions By Hand
Rules:
1. Convert Mixed Numbers to Improper Fractions (if necessary)
2. Simplify each fraction
3. Multiply straight across

Find each product:
1) \( \frac{1}{2} \times \frac{2}{3} \)
2) \( -\frac{1}{4} \times \frac{2}{5} \)
3) \( -2\frac{1}{2} \times -1\frac{3}{5} \)

Dividing Fractions By Hand
Rules:
1. Convert Mixed Numbers to Improper Fractions (if necessary)
2. Change to multiplication of the reciprocal
3. Follow multiplication steps

Find each quotient:
4) \( \frac{1}{4} ÷ (-\frac{3}{8}) \)
5) \( -\frac{3}{5} ÷ -\frac{2}{3} \)
6) \( \frac{5}{16} ÷ 2\frac{1}{2} \)

Word Problems
**In word problems, when dealing with fractions the word ‘OF’ means to MULTIPLY**

Example 1: \( \frac{3}{5} \) of 8
Example 2: \( \frac{2}{3} \) of \( \frac{9}{19} \)

7) \( \frac{4}{5} \) of the 12,000 people at the Met game are wearing Mets hats. How many people are wearing Met hats?

8) Anthony \( \frac{4}{5} \) of an Apple Pie. The next day, Kyle ate \( \frac{1}{2} \) of the remaining pie. How much did Kyle eat?
Complex Fraction - a fraction where the numerator, denominator, or both contain a fraction.

Change the following mixed numbers to an improper fraction.

a) $2 \frac{1}{4}$  
b) $5 \frac{4}{5}$  
c) $8 \frac{3}{10}$

Examples:

Solve each of the following and reduce your answers to lowest terms.

1. $\frac{1}{3} \div \frac{2}{5}$  
2. $\frac{9}{3} \div \frac{4}{5}$  
3. $\frac{1 + 2}{3}$

4. $10 \div 2 \frac{2}{5}$  
5. $\frac{8}{9} \div 3$  
6. $\frac{2\frac{1}{6}}{\frac{4}{9}}$

7. Luke walked his dog $\frac{3}{4}$ mile every day. It takes him $\frac{1}{3}$ hour to walk that distance. How fast does he walk in miles per hour?
Try These:

1. \(\frac{3}{2} \div \frac{2}{5}\)
2. \(\frac{1}{8} \div \frac{1}{6}\)

3. \(\frac{1}{2} \times \frac{1}{2}\)
4. \(\frac{3}{2} \div \frac{5}{5}\)
5. \(\left(\frac{1}{4}\right) \left(\frac{2}{15}\right)\)

6. \(\frac{2}{5} + \frac{7}{20}\)
7. \(\frac{2}{5} + (-\frac{3}{2})\)
8. \((-\frac{1}{3}) \times (-\frac{3}{4})\)
Lesson 2 – Homework

Word Problems:

1) Joanne has $13\frac{1}{2}$ yards of material to make costumes. Each complete costume requires $1\frac{1}{2}$ yards for the top and $\frac{3}{4}$ yard for the bottom. How many complete costumes can she make?

2) On the first day the Apple iPhone 5 was released, the local store had 200 in stock. By 8:00 pm, the store had sold $\frac{3}{5}$ of their stock.
   [a] How many iPhones were left in the store’s stock?
   [b] If each iPhone sold for $500, how much money did the Apple store make in iPhone sales?

3) On Saturday, you hiked $4\frac{3}{8}$ miles. On Sunday, you hiked $3\frac{1}{2}$ miles. How far did you hike during the weekend?

4) The gas tank in your family’s car was $\frac{7}{8}$ full when you left your house. When you arrived at your destination, the tank was $\frac{1}{4}$ full. What fraction of a tank of gas did you use during the trip?

5) Dennis rowed $\frac{2}{3}$ mile. Maggie rowed $\frac{6}{10}$ mile. Who rowed further? How much further?
Solve each of the following questions and be sure to show all work.

6) The length of a kangaroo’s leap can be up to $6 \frac{1}{2}$ times its height. If a kangaroo is $7 \frac{1}{2}$ feet tall, how far can it jump?

7) Susan threw the javelin $76 \frac{2}{3}$ meters for her first throw and $72 \frac{3}{4}$ meters for her second throw. How much longer was her first throw than her second throw?

8) Mrs. Kurka’s family went for a trip. To make the journey interesting, they traveled first $\frac{5}{4} \frac{1}{4}$ miles by car and the remaining $10 \frac{2}{3}$ miles by horse. What was the total distance of the trip?

9) $\frac{4}{7}$ of birthday cake was eaten on your birthday. The next day your dad ate half of what was left. You get to finish the cake. How much was left?

10) The recipe for mint chocolate chip ice cream requires 2.25 cups of cream for 5 people. You need ice cream for 8 people. How much cream will you need?

11) The grocery store parking lot will hold 1000 vehicles. $\frac{2}{5}$ of the parking spaces are for cars. When you went to buys groceries there were 200 cars and some trucks in the parking lot. The parking lot was $\frac{3}{4}$ full. How many trucks were in it?
Lesson 3
Fractions and Decimals-Compare and Order

Aim: I can compare and order fractions and decimals.

Warm Up:

1. Give four examples of integers: ________________________________
2. Give four examples of whole numbers: ________________________________
3. Give four examples of counting (natural) numbers: ________________________________
4. Give four examples of integers that are *not* whole numbers: ________________________________
5. Give four examples of rational numbers: ________________________________
6. Give four examples of irrational numbers: ________________________________

<table>
<thead>
<tr>
<th>Types of Fractions</th>
<th>Types of Decimals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Fractions</td>
<td>Terminating Decimals</td>
</tr>
<tr>
<td>Improper Fractions</td>
<td>Non-Terminating/ Non Repeating Decimals</td>
</tr>
<tr>
<td>Mixed Numbers</td>
<td>Repeating Decimals</td>
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### Fractions to Remember:

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<th>Decimal</th>
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</thead>
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<td>$\frac{1}{4}$</td>
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</tr>
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<td>$\frac{2}{4}$</td>
<td>0.5</td>
</tr>
<tr>
<td>$\frac{3}{4}$</td>
<td>0.75</td>
</tr>
<tr>
<td>$\frac{1}{5}$</td>
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<tr>
<td>$\frac{2}{5}$</td>
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<td>0.6</td>
</tr>
<tr>
<td>$\frac{4}{5}$</td>
<td>0.8</td>
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</table>

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Decimal</th>
</tr>
</thead>
<tbody>
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<td>$\frac{1}{3}$</td>
<td>0.333...</td>
</tr>
<tr>
<td>$\frac{2}{3}$</td>
<td>0.666...</td>
</tr>
<tr>
<td>$\frac{1}{8}$</td>
<td>0.125</td>
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<tr>
<td>$\frac{3}{8}$</td>
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<tr>
<td>$\frac{5}{8}$</td>
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<tr>
<td>$\frac{7}{8}$</td>
<td>0.875</td>
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<table>
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<tr>
<td>$\frac{4}{9}$</td>
<td>0.444...</td>
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<tr>
<td>$\frac{5}{9}$</td>
<td>0.555...</td>
</tr>
<tr>
<td>$\frac{7}{9}$</td>
<td>0.777...</td>
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<td>$\frac{8}{9}$</td>
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<tr>
<td>$\frac{3}{10}$</td>
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<td>$\frac{7}{10}$</td>
<td>0.7</td>
</tr>
<tr>
<td>$\frac{9}{10}$</td>
<td>0.9</td>
</tr>
</tbody>
</table>

### Converting Fractions to Decimals:

Divide the denominator into the numerator:

Examples:

- $\frac{1}{4} = 0.25$
- $3\frac{2}{5} = 3.4$  

### Converting Decimals to Fractions:

1. Determine what place the decimal goes to (tenth, hundredth, thousandth, etc.)
2. Write the number in the numerator of a fraction with the place in the denominator
3. Simplify if possible

Examples:

- 0.37
- 0.6

### Examples:

Convert each fraction or mixed number to a decimal (round to the nearest hundredth if necessary):

1. $\frac{1}{9}$
2. $\frac{7}{8}$
3. $3\frac{4}{5}$

Convert each decimal to a fraction or mixed number:

4. 0.5
5. 0.91
6. 0.15
7. 3.05
Comparing Fractions and Decimals

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<th>Method 2</th>
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<td>1. Convert all numbers to decimals (all to the same place)</td>
<td>1. Convert all numbers to fractions with a common denominator</td>
</tr>
<tr>
<td>2. Compare or Order</td>
<td>2. Compare or Order</td>
</tr>
</tbody>
</table>

ex: \(\frac{3}{10}, \frac{1}{4}, \frac{3}{8}, 0.5, 0.7\)

ex: \(\frac{3}{10}, \frac{1}{4}, \frac{3}{8}, 0.5, 0.7\)

Compare:

8. \[0.6 \bigcirc 0.525\] 9. \[\frac{3}{4} \bigcirc \frac{3}{8}\] 10. \[0.8 \bigcirc \frac{17}{20}\] 11. \[3\frac{5}{8} \bigcirc 3.625\]

Order the given set of numbers from least to greatest:

12. \[\frac{7}{10}, \frac{3}{4}, -\frac{3}{8}, 0.25, 0.9\] 13. \[\frac{5}{8}, -\frac{3}{4}, 1\frac{3}{8}, 1.25, -1.1\]

Plot the given set of numbers on the number line:

14. \[\frac{7}{10}, \frac{3}{4}, -\frac{3}{8}, 0.25, 0.9\] 15. \[2\frac{5}{8}, -\frac{1}{4}, -1\frac{1}{4}, 0.25, -1.75\]
Try These: Convert Each Fraction to a Decimal:

1. \( \frac{3}{5} \)  
2. \( 3\frac{1}{8} \)  
3. \( \frac{7}{5} \)  
4. \( \frac{9}{25} \)  
5. \( \frac{17}{20} \)  
6. \( \frac{53}{50} \)

Convert each decimal to a fraction or mixed number:

7. 0.23  
8. 0.251  
9. 0.625  
10. 0.2  
11. 0.36  
12. 17.375

13. The Yankees won 97 out of 162 games in the 2011 regular season.
   [a] Express this as a fraction
   [b] Convert the fraction to a decimal (round to the nearest hundredth)

14. Place the following numbers on the number line:
   \[-2.5, 0.5, -1.5, 0.75, 2.25\]

   \[\text{Number Line:} -3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3\]

Compare:

15. \(-0.25 \underline{\quad} -0.2\)  
16. \(-\frac{4}{5} \underline{\quad} -\frac{7}{9}\)  
17. \(0.5 \underline{\quad} \frac{11}{20}\)  
18. \(\frac{7}{8} \underline{\quad} 3.9\)
Order the given set of numbers from least to greatest:

19. \( \frac{1}{3}, \frac{5}{2}, -\frac{7}{3}, 0.\bar{6}, 0.6 \)

20. \( \frac{3}{5}, -\frac{1}{4}, -\frac{3}{4}, \sqrt{4}, \pi \)

Plot the given set of numbers on the number line:

21. \( \frac{2}{3}, \frac{3}{2}, -\frac{1}{3}, 0.\bar{3}, 0.3 \)

22. \( \frac{6}{5}, \frac{4}{5}, 2\frac{1}{4}, \sqrt{9}, \pi \)

Classwork:

Convert each Fraction/Decimal to a Decimal/Fraction:

1. \( \frac{5}{11} \)

2. \( 2\frac{3}{7} \)

3. \( \frac{4}{7} \)

4. 0.25

5. 0.7

6. A batting average is calculated by dividing the total number of hits by the number of at bats. Alex had 9 hits in 25 at bats in 8 games. Over the course of the same 8 games, Derek averaged two hits per game and five at bats per game.

   [a] How many hits did Derek have in the 8 game span?  [b] Which player had more at bats in this span?

   [c] Which player had a higher batting average?

Compare:

7. \(-0.75 \bigcirc -0.7\)

8. \(-\frac{3}{5} \bigcirc -0.\bar{6}\)

9. \(0.6 \bigcirc \frac{7}{11}\)

10. \(5\frac{7}{8} \bigcirc 5.9\)
Lesson 8 – Homework

Convert each fraction or mixed number to a decimal (round to the nearest hundredth if necessary):

1. \(\frac{2}{9}\)
2. \(\frac{5}{8}\)
3. \(\frac{2}{5}\)

4. \(4\frac{8}{9}\)
5. \(2\frac{7}{8}\)
6. \(\frac{19}{5}\)

7. \(\frac{2}{11}\)
8. \(1\frac{7}{7}\)
9. \(\frac{9}{8}\)

Convert each decimal to a fraction or mixed number:

10. 0.75
11. 0.9
12. 0.125

13. 0.234
14. 0.2
15. 0.875

16. 0.\overline{4}
17. 3.9
18. 0.45

19. The Mets won 77 out of 162 games in the 2011 regular season.
   a) Express this as a fraction

   b) Convert the fraction to a decimal (round to the nearest hundredth)

20. Place the following numbers on the number line:

\[-\frac{2}{5}, \quad 2\frac{1}{2}, \quad -1\frac{1}{2}, \quad \frac{3}{4}, \quad \frac{5}{2}\]
25. The area of a square is 196 square units.
   a) What is the length of each side?
   b) What is the perimeter?

26. The area of a square is 81 square units.
   a) What is the length of each side?
   b) What is the perimeter?

27. Is \( \frac{7}{11} \) a rational number or an irrational number? Explain.
__________________________________________________________________________________________
__________________________________________________________________________________________
__________________________________________________________________________________________

Compare:
31. \( 0.7 \) \( \bigcirc \) 0.60  
32. \( \frac{3}{29} \) \( \bigcirc \) \( \frac{7}{49} \)  
33. \( 0.4 \) \( \bigcirc \) \( \frac{9}{29} \)  
34. \( 3 \frac{1}{4} \) \( \bigcirc \) 3.3

35. \(-0.5 \) \( \bigcirc \) -0.7  
36. \( -\frac{4}{9} \) \( \bigcirc \) \( -\frac{5}{9} \)  
37. \( 0.7 \) \( \bigcirc \) \( \frac{15}{29} \)  
38. \( 6 \frac{1}{8} \) \( \bigcirc \) 6.12

39. \( 0.\overline{4} \) \( \bigcirc \) 0.4  
40. \( -\frac{3}{12} \) \( \bigcirc \) \( -\frac{1}{4} \)  
41. \(-0.75 \) \( \bigcirc \) -0.7  
42. \(-4 \frac{1}{9} \) \( \bigcirc \) -4.5

Order the given set of numbers from least to greatest:
43. \( \frac{7}{9} , \frac{3}{4} , -\frac{1}{8} , -0.5 , 0.1 \)  
44. \( \frac{7}{8} , -\frac{5}{4} , \frac{5}{8} , \sqrt{225} , -11 \)
Plot the given set of numbers on the number line:

47. \( \frac{3}{10}, \frac{1}{4}, -\frac{1}{2}, 2.25, 1.9 \)  
48. \( 2\frac{4}{5}, -\frac{3}{4}, 1\frac{3}{4}, -2, \sqrt{2} \)

51. Suppose you buy a 1.25-pound package of ham at $5.20 per pound.
   
   [a] What fraction of a pound did you buy?
   
   [b] How much money did you spend?

52. Complete the chart by putting a check in the correct column:

<table>
<thead>
<tr>
<th></th>
<th>-3</th>
<th>( \frac{1}{5} )</th>
<th>( \sqrt{50} )</th>
<th>0.7238…</th>
<th>0.5</th>
<th>7\pi</th>
<th>0</th>
<th>1</th>
<th>( \sqrt{196} )</th>
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</tbody>
</table>
EXTRA REVIEW RATIONAL NUMBER APPLICATION (DECIMALS)

USE A CALCULATOR TO SOLVE EACH OF THE FOLLOWING, SHOW ALL WORK:

1. John goes to a gas station that sells gas for $4.04/gallon to fill up his car. His car’s gas tank has a capacity of 14.78 gallons. John’s tank, however, is not empty; the car still has 1.39 gallons of gas in it. If John intends to fill his car up to capacity, how much money will he spend?

2. Pathmark has a sale on oranges: 5 for $4.79. Stop and Shop charges $0.96 per orange. If Kelly wants to buy 10 oranges, which store should she go to? How much would she save?

3. A rare truffle once sold for $13.20 for a 0.44 lb can.
   a. How many cans would you need to buy if you wanted at least 10 lbs?

   b. What would it cost to purchase this amount of cans?

4. On vacation, you wish to send 28 postcards to family members back home. Each postcard costs $1.49, while stamps cost $3.43 for a pack of seven. How much will it cost in total to send these 28 postcards?

5. Paul stops by the market to buy his lunch. The market is selling bananas for $0.22 each, and sandwiches for $3.95. How much does Paul spend if he purchases one sandwich and three bananas?
6. A GROUP OF FOUR FRIENDS ARE PLANNING TO TAKE A TRIP FROM NEW YORK TO NASHVILLE, TENNESSEE. THEY ARE LOOKING INTO THE PRICE OF DRIVING AS OPPOSED TO FLYING.

A. THE DISTANCE OF THE TRIP IS 939.8 MILES. THE AVERAGE PRICE OF GAS IN THE UNITED STATES IS $3.72. THE CAR THE GROUP PLANS TO TAKE GETS 24.3 MILES PER GALLON. HOW MUCH WILL IT COST THE GROUP TO DRIVE? (ROUND TRIP)

B. THE COST PER TICKET FOR A ROUND TRIP FLIGHT FROM JFK TO NASHVILLE IS $268.29. HOW MUCH WOULD IT COST THE GROUP TO FLY?

C. WHICH OPTION IS CHEAPER? BY HOW MUCH?

7. AJ IS THE OWNER OF A SPORTS STORE. HE IS LOOKING INTO STOCKING HIS STORE WITH A NEW BRAND OF BASEBALL BATS. THERE ARE THREE DIFFERENT COMPANIES THAT SELL THIS PARTICULAR BAT. EACH COMPANY IS RUNNING A DIFFERENT SALE ON THESE BATS, ALL LISTED BELOW.

<table>
<thead>
<tr>
<th>JOHN'S BASEBALL SUPPLY</th>
<th>BASEBALL PLUS</th>
<th>SPORT SUPPLIERS</th>
</tr>
</thead>
</table>
| **BUY 3 BATS AT THE LIST PRICE OF $89.79 AND GET A FOURTH BAT FREE!** | **PRICE PER BAT: $71.95**
**IF YOU PURCHASE MORE THAN 150 BATS, RECEIVE 10% OFF THE ENTIRE ORDER!** | **PRICE PER BAT: $77.75**
**IF YOU PURCHASE MORE THAN 200 BATS, RECEIVE $3000 OFF THE ENTIRE ORDER!** |

A. IN THE BEGINNING OF JANUARY, AJ WANTS TO STOCK HIS STORE WITH 100 BATS. WHICH COMPANY WOULD BE THE CHEAPEST?

B. AS BASEBALL SEASON APPROACHES, AJ WANTS TO INCREASE HIS STOCK OF BATS TO 300. IF HE HAD SOLD A TOTAL OF 28 BATS SINCE JANUARY, WHICH COMPANY WOULD BE BEST FOR HIS NEXT PURCHASE?

C. AJ SELLS OUT OF BATS IN EARLY APRIL. HE WANTS TO RESTOCK, BUT IS ADVISED TO LOOK INTO PURCHASING FOR A FULL YEAR. HE ESTIMATES THAT HE WILL SELL 2500 BATS PER YEAR. IF HE WANTS TO PURCHASE 2500 BATS TO STOCK HIS WAREHOUSE, WHICH COMPANY IS BEST?

D. WHILE LOOKING INTO MAKING THIS PURCHASE, AJ RECEIVES A SPECIAL OFFER FROM SPORTS SUPPLIERS. THEY TELL AJ THAT THEY WILL REDUCE THE PRICE PER BAT BY $10 IF AJ AGREES TO MAKE ALL FUTURE PURCHASES THROUGH THEM. IS THIS DEAL CHEAPER THAN THE OTHER TWO COMPANIES IF AJ STILL INTENDS TO PURCHASE 2500 BATS?
Fractions to Remember:

\[
\begin{align*}
\frac{1}{4} &= .25 & \frac{1}{2} &= .5 & \frac{3}{4} &= .75 \\
\frac{1}{5} &= .2 & \frac{2}{5} &= .4 & \frac{3}{5} &= .6 & \frac{4}{5} &= .8 \\
\frac{1}{3} &= .\overline{3} & \frac{2}{3} &= .6 & \frac{1}{8} &= .125 & \frac{3}{8} &= .375 & \frac{5}{8} &= .625 & \frac{7}{8} &= .875 \\
\frac{1}{9} &= .\overline{1} & \frac{2}{9} &= .\overline{2} & \frac{4}{9} &= .\overline{4} & \frac{5}{9} &= .\overline{5} & \frac{7}{9} &= .\overline{7} & \frac{8}{9} &= .\overline{8} \\
\frac{1}{10} &= .1 & \frac{2}{10} &= .2 & \frac{3}{10} &= .3 & \frac{4}{10} &= .4 & \frac{5}{10} &= .5 & \frac{6}{10} &= .6 & \frac{7}{10} &= .7 & \frac{8}{10} &= .8 & \frac{9}{10} &= .9 & \frac{10}{10} &= 1
\end{align*}
\]
Round the following decimals to the
a) nearest tenth:
   1) 18.1286

b) nearest hundredth:
   2) 2.4234

   3) 3.2978

c) nearest whole number:

Write each fraction or mixed number as a decimal.

4) \( \frac{2}{3} \)

5) \( \frac{1}{2} \)

6) \( \frac{4}{5} \)

Write each decimal as a fraction.

7) .6

8) .45

9) 4.3

Replace \( \bigcirc \) with <, >, or =.

10) \( \frac{4}{5} \bigcirc \frac{5}{6} \)

11) .35 \( \bigcirc \frac{1}{3} \)

12) 5.1 \( \bigcirc \frac{51}{10} \)

Order the set of rational numbers from least to greatest. Graph on the number line.

13) \{ \( \frac{1}{5} \), 3.8, \( \frac{2}{3} \), 0.75 \}

14) \{ \( \frac{6}{3} \), 1.5, \( \frac{1}{3} \), \( \frac{4}{8} \) \}

Graph on the number line.

Graph on the number line.
Convert the following into a mixed number or an improper fraction:

15) $2 \frac{1}{3}$

16) $\frac{16}{5}$

17) $6 \frac{5}{6}$

Find the sum or difference:

18) $4.1 + 2.9$

19) $-12.8 + 3$

20) $12.362 - (-3.41)$

Find the product:

21) $(4.3)(1.45)$

22) $(6.3)(-7.4)$

23) $(-13.1)(-2.6)$

Find the quotient:

24) $15.8 \div 2$

25) $\frac{-22}{0.4}$

26) $\frac{12.15}{2.7}$

Find each sum or difference:

27) $\frac{1}{4} + \frac{3}{6}$

28) $\frac{7}{12} - \frac{1}{3}$

29) $\frac{3}{5} - \frac{1}{3}$

30) $\frac{3}{10} - (-1\frac{3}{5})$

31) $4 - 2\frac{3}{10}$

32) $-3\frac{1}{2} + -4\frac{1}{3}$
Find each product or quotient:

33) \(\frac{5}{8} \cdot \frac{2}{5}\)  

34) \(\frac{3}{8} \div \frac{2}{3}\)  

35) \(\frac{2}{\frac{4}{5}}\)

36) \(3\frac{5}{6} + 2\frac{1}{4}\)  

37) \(\frac{3}{5} \div 1\frac{1}{5}\)  

38) \(\frac{6}{\frac{3}{5}}\)

Word Problems:

39) What is \(\frac{3}{4}\) of 24?

40) Monica had 18 cookies. If Monica ate \(\frac{1}{6}\) of the cookies after dinner, how many cookies were left?

41) Joe made two types of desserts. He used \(\frac{2}{3}\) cups of sugar for one recipe and \(\frac{3}{4}\) cups of sugar for the other recipe. How much sugar did he use in all?

42) Six cases of paper cost $43.50. How much does one case cost?

Unit 2 Vocabulary:

Sum: ______________________________________________________________________

Simplify: __________________________________________________________________

Difference: __________________________________________________________________

Convert: ___________________________________________________________________

Product: ___________________________________________________________________

LCD: _______________________________________________________________________

Quotient: __________________________________________________________________

Complex Fraction: _______________________________________________________________________

Numerator: _____________________________________________________________________

Denominator: ___________________________________________________________________

Reciprocal: ____________________________________________________________________

Improper Fraction: _______________________________________________________________________

Mixed Number: _____________________________________________________________________
Unit 3
Expressions

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Lesson 1
Classifying Polynomials & Combining like Terms

AIM: I can identify and combine like terms and classify polynomials.

Warm Up:

Important Vocabulary:

Variable: ________________________________________________________________________________
Coefficient: _______________________________________________________________________________
Constant: ____________________________

Ex: $3x + 5$  Variable: _____  Coefficient:____  Constant:____

Term: ____________________________________________________________________________________

Polynomial: ______________________________________________________________________________

Monomial: _________________________________________________________________________________

Ex 1: _____________  Ex 2: _____________  Ex 3: _____________

Binomial: ________________________________________________________________________________

Ex 1: _____________  Ex 2: _____________  Ex 3: _____________
Trinomial: ______________________________________________________________________________

Ex 1: ________________  Ex 2: ________________  Ex 3: ________________

Like Terms: ______________________________________________________________________________

Ex 1: ________________  Ex 2: ________________  Ex 3: ________________

Perimeter: ______________________________________________________________________________

Examples:

Identify the Variable, Coefficient and Constant in Each of the Following:

1. 4y + 7  
   Variable:____  Coefficient:____  Constant:____
2. 3x + 12  
   Variable:____  Coefficient:____  Constant:____
3. −2z + 17  
   Variable:____  Coefficient:____  Constant:____
4. x − 3  
   Variable:____  Coefficient:____  Constant:____
5. 19x  
   Variable:____  Coefficient:____  Constant:____

Classify Each of the Following as Monomials, Binomials, or Trinomials:

6. 14x − 2  
7. 3x + 4y  
8. 5x  
9. 3x + 2y − 2z  
10. 3xyz  
11. x + y + z  
12. 2x − y  
13. 14x  
14. 5x + y − z  
15. 2x  

State whether the given terms are like terms or not like terms:

16. 3x & 4  
17. 5x & 8x  
18. 4ab & 2ac  
19. 12 & 3  
20. 8a & − 4a  
21. x & 4x  
22. xy & x  
23. x^2 & x  
24. 10z & 2z  
25. 2x & − 4
### Combining Like Terms:

**Step 1** – Identify like terms  
**Step 2** – Perform appropriate operation to combine like terms

#### Simplify Each Expression:

1) \(3x + 6x\)  
2) \(2x + 2 + 1\)  
3) \(8y + 7y\)  

4) \(8x + 2x + 5\)  
5) \(5x + x\)  
6) \(3x + 2 + y\)  

7) \(9x + 4y + 2x + 3y\)  
8) \(7x + 8 + x + 3\)  
9) \(8x + 4x\)  

10) \(4x + 7y + 4 + 5x + y\)  
11) \(8x + 10.2 + 4x + 2.9\)  
12) \(8y + 4 + 7\)  

13) \(9.2x + 4.3y + x\)  
14) \(9y + 2y\)  
15) \(3x + 5y + 6\)  

#### Write an expression in simplest form for the perimeter of each figure:

15) \(3.6y + 2.8y + 4\)  
16) \(5x + 5x + 5x + 5x + 5x\)  
17) \(6x + x + 3\)
Lesson 1 – Classwork/Homework

Circle "like" or "not like" for the following terms:

1) \( x \) \( 2x \)  
2) \( 6a \) \( 4 \)  
3) \( 2x^2 \) \( x \)  
4) \( z \) \( 3z \)  
5) \( \frac{1}{2}x \) \( 4y \)

\( \begin{array}{llllll}
1) & \text{like} & \text{not like} \\
2) & \text{like} & \text{not like} \\
3) & \text{like} & \text{not like} \\
4) & \text{like} & \text{not like} \\
5) & \text{like} & \text{not like} \\
\end{array} \)

a) Determine what the coefficient is, b) Determine what the variable is, and c) Determine what the constant is:

6) \( 3x + 5 \)  
7) \( 2y + 9 \)  
8) \( -9a + 10 \)  
9) \( 7z + 18 \)  
10) \( 12z - 10 \)

\( \begin{array}{llllll}
a) & \text{a)} & \text{a)} & \text{a)} & \text{a)} & \text{a)} \\
b) & \text{b)} & \text{b)} & \text{b)} & \text{b)} & \text{b)} \\
c) & \text{c)} & \text{c)} & \text{c)} & \text{c)} & \text{c)} \\
\end{array} \)

Simplify the following expressions:

11) \( 5x + 3x \)  
12) \( 8x + 4x \)  
13) \( 6x + 4x + x \)  
14) \( 2x + x + 8 \)  
15) \( 3x + 5 + x \)  
16) \( 3x + 2x + y + 3y \)  
17) \( 7 + 6x + 2 + 3x \)  
18) \( x + 2x + 2y + 3y \)  
19) \( x + x + y + y \)  
20) \( 7x + 3 + 4x + 5y + 10 \)  
21) \( 9x + 6y + 4 + 2x + y + 2 \)  
22) \( x + 5 + 6x \)  
23) \( 3.2x + 5 + 6.8x \)  
24) \( 4x + 4.2 + 5x + 2.6 \)  
25) \( \frac{2}{5}x + 7y + \frac{3}{10}x + 10y \)
Lesson 2
Combining Like Terms with Negatives

**AIM:** I can identify and combine like terms with negatives.

**Warm Up:**

Simplify the following expression: \(3x + 5y - 2x - 8y\)

**Step 1:** Draw a shape around like terms [3x + 5y - 2x - 8y]

**Be sure to take the sign in front of the coefficient!!!**

**Step 2:** Use your integer rules to combine (add) the like terms.

<table>
<thead>
<tr>
<th>X’s</th>
<th>Y’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>3x + 5y</td>
<td>-2x - 8y</td>
</tr>
</tbody>
</table>

Same signs add and keep,
Different signs subtract.
Keep the sign of the higher number,
Than you’ll be exact!! ☺

\(= 1x - 3y\)

**Step 3:** Use the sign in your second term as your plus or minus sign.

**Examples:** Simplify Each Expression

1) \(7x - 2x\)    
2) \(-3y - 4y\)    
3) \(6x + 3 - 4x + 5\)    
4) \(10s + 4t - 5s - 2t\)    
5) \(4y - 3 + 2y - 2\)    
6) \(7x - 9 + 3x\)
Try These: Simplify Each Expression

7) $7x + 5 - 7x - 9$
8) $6x + 8y - 9x - 2y$
9) $5x + 7y - 5y - 5x$

10) $8x + 9y - 4 + x - 6y - 3$
11) $4x + 9y - 5y + 3x$
12) $6.2y - 5.6x + y$

Lesson 2 – Classwork/Homework

Simplify each expression:

1) $5x - 2x$
2) $-4y - 6y$
3) $7x + 4y + x - 8y$
4) $6x + 8 - 2x + 5$

5) $9y - 7 + 2y - 2$
6) $5x - 9 + 2x + 9$
7) $-9x + 5 - 7x - 7$
8) $6x + 5y - 6x - 2y$

9) $-10s + 4t - s - 9t$
10) $-4x + 4x$
11) $8y - 4 - 7$
12) $-x - 5 + 6x$

13) $7.2x - 5 + 3.6x + 6$
14) Write an expression with a sum of $-5x + 4$.

15) Find the perimeter:
AIM: I can simplify expressions using the distributive property.

Warm Up:

The Distributive Property is one of the basic properties of the real number system.

To distribute something means to hand it out. If you distribute a test paper to your class, you give a test to each person in the class.

The Distributive Property says that if a, b, and c are real numbers, then:

\[ a(b + c) = (a \cdot b) + (a \cdot c) \]
\[ = ab + ac \]

To "simplify" this, we have to remove the parentheses. The Distributive Property says to multiply the outside number to everything inside the parentheses. Draw arrows as a reminder.

Example 1: Simplify 3(x + 4)  

\[ 3(x + 4) \]
\[ 3(x) + 3(4) \]
\[ 3x + 12 \]

Example 2: Simplify -3(x + 4)  

\[ -3(x + 4) \]
\[ -3(x) + -3(4) \]
\[ -3x + -12 \] or \[ -3x - 12 \]

Examples: Distribute

1) 2(x + 6)  
2) 3(2x – 4)  
3) 4(-3x + 5)  
4) 2(5x – 7)
Distributing by a negative 1 is the same as taking the _______.

-1(200) = ______  -1(-200) = ______  -1(5) = ______  -1(-5) = ______  -1(-300000) = ________

5) \(-(-3x + 4)\)  6) \(-(3x - 4)\)  7) \(-(-2x + 6)\)  8) \(-(7x - 8)\)

9) \(-3(-2x + 5)\)  10) \(-4(5x - 3)\)  11) \(-2(6x - 9)\)  12) \(-5(8x - 9)\)

13) \(\frac{1}{2}(6x - 8)\)  14) \(\frac{1}{3}(9x - 6)\)  15) \(-\frac{1}{2}(-10x + 14)\)  16) \(\frac{1}{5}(15x - 10)\)

**Try These:**

1) \(4(2x - 1)\)  2) \(6(x + 3)\)  3) \(5(3x - 4)\)  4) \(3(8x + 2)\)
5) 2(-4x + 3)  
6) -5(6x + 3)  
7) -(2x - 5)  
8) (4x + 1)3

9) \( \frac{1}{2}(4x + 6) \)  
10) \( \frac{1}{5}(10x - 15) \)  

10) Find the area of the following:

\[ \frac{5}{6x - 7} \]

11) 2(3x + 2)  
12) 4(5x - 4)  
13) 3(6x + 7)  
14) -4(x - 4)  
15) 5(-6x + 2)

16) -3(x - 5)  
17) 5(-2x - 6)  
18) -(5x + 4)  
19) -2(4x - 3)  
20) -6(2x - 3)

21) \( \frac{1}{3}(9x + 12) \)  
22) \( \frac{1}{4}(16x - 4) \)  

23) Find the area of the following:

\[ \frac{3}{2x - 4} \]
Classwork:

1) \(3(4 + 3y)\)  
2) \(-2(6x - 8)\)  
3) \(4(x + 5)\)

4) \(-(-2 - 5n)\)  
5) \(\frac{1}{2}(8n + 2)\)  
6) \(-2(3x + 1)\)

7) Find the area of the following:

8) Find the area of the following:

7  
6  
5x - 6

6  
7  
6x + 2
Lesson 3 - Homework

1) \(-4(x + 3)\)  
2) \(2(x - 5)\)  
3) \(-3(x + 6)\)  
4) \(-(-x + 7)\)

5) \(9(-x - 2)\)  
6) \(5(3x - 4)\)  
7) \(\frac{1}{3}(6x + 15)\)  
8) \(-10(a - 5)\)

9) Find the area of the following:  
10) Find the area of the following:

\[
\begin{align*}
\text{Area 1: } & \quad 6 \times (5x - 6) \\
\text{Area 2: } & \quad 7 \times (6x + 2)
\end{align*}
\]

Review:

Identify the Variable, Coefficient and Constant in Each of the Following:

11) \(2a + 6\)  
Variable:_____
Coefficient:_____  
Constant:_____

12) \(x + 12\)  
Variable:_____
Coefficient:_____  
Constant:_____

13) \(-z + 1\)  
Variable:_____
Coefficient:_____  
Constant:_____  

Classify Each of the Following as Monomials, Binomials, or Trinomials:

14) \(14x - 2x\)  
15) \(3x + 4y\)  
16) \(5x\)  
17) \(3x + 2y - 2z\)  
18) \(3xyz\)

Simplify the following expression

19) \(6x + 4y + 7x + y\)  
20) \(9x - 7y - 2x + 9y\)  
21) \(7x + 5y - 7x - 8y\)
Lesson 4
Distribute and Combine Like Terms

AIM: I can simplify expressions by distributing and combining like terms.

Warm Up:

Example:

\[2(3x + 5) + 4\]

**Step 1:** Box out the distributive property
(Be sure to take the sign in front)

\[2(3x + 5) + 4\]

**Step 2:** Bring down everything outside the box

\[\downarrow \downarrow + 4\]

**Step 3:** Distribute

\[6x + 10 + 4\]

**Step 4:** Combine Like Terms

\[6x + 10 + 4\]

Answer: \[6x + 14\]

**Remember:** You must distribute first before you combine like terms!

**Examples:** Simplify each expression:

1) \[4(2x + 3) + 6x\]
2) \[8(x - 5) + 20\]
3) \[-(x + 7) + 8x\]
4) \[3 + 2(2x + 6) + x\]
5) \[5x + 3(2x - 6) + 1\]
6) \[2(3x - 4) + 4 - 9\]
7) \[3(5 + 4x) + 12x\]
8) \[9x + 5(-3x - 5)\]
Try These: Simplify Each Expression

1) $2(3x + 1) + 4x$  
2) $-5(2x + 4) + 10$  
3) $-(x + 4) + 7x$  
4) $7 - 3(x + 9)$

5) $5x + 3(2x - 6) + 1$  
6) $6(3x - 4) - 15x$  
7) $9 + \frac{1}{2}(2x + 4)$  
8) $5x - 3(x - 4) + 6$
### Lesson 4 - Homework

Simplify.

1) $4x + 2(3x + 4)$

2) $-5(x + 8) - 12$

3) $-(x + 3) + 5x$

4) $8 - 9(x + 4)$

5) $8x + 4(2x - 5)$

6) $\frac{1}{2} (4x - 4) + 4x$

7) $6(5 - 2x) - 20$

8) $10x + 4(-3x - 5)$

9) $6x + 3(x - 7)$

10) $\frac{1}{2} (6x - 4) - 5x$

11) $-(6 + 2x) - 12$

12) $7x - (3x - 5)$

13) $3(3x - 5) + 6x$

14) $2(4 - 2x) + 4x - 8$

15) $-2(5 + 2x) + 12x$

16) $-10x + 4(-8x - 2)$
### AIM: I can find the greatest common factor.

#### Warm Up:
Find the prime factors using prime factorization.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>2</td>
<td>45</td>
</tr>
<tr>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>4</td>
<td>49</td>
</tr>
</tbody>
</table>

#### Vocabulary:
- **Factors** -
- **Prime** -
- **Composite** -
- **Greatest Common Factors (GCF)** -

#### Finding the Greatest Common Factor (GCF)

<table>
<thead>
<tr>
<th>Method 1 (List the factors)</th>
<th>Method 2 (Prime Factorization)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 and 45</td>
<td>30 and 45</td>
</tr>
<tr>
<td>GCF=________</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>45</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Prime factors of 30____

Prime factors of 45____

### Finding GCF using Prime Factorization
1. List the prime factors of each number.
2. Multiply the factors **both** numbers have in common. If there are no common prime factors, the GCF is 1 (**relatively prime**).

Prime factors of 30 and 45 in common ________________
Examples:

Find the Greatest Common Factors using prime factorization method if necessary.

1) 18 and 24  
2) 12 and 8  
3) 99 and 18  
4) \( \frac{8}{5} \) and \( 1 \frac{4}{5} \)

5) 8 and 4  
6) 15 and 10  
7) 6 and 9  
8) \( \frac{1}{2} \) and \( 4 \frac{1}{4} \)

Try These:

Find the GCF of the numbers given:

1) 16 and 28  
2) 30 and 24  
3) 8 and 16  
4) 5 and 20

5) 24 and 36  
6) 12 and 15  
7) 30 and 40  
8) 35 and 49

9) 21 and 7  
10) 6 and 12  
11) \( \frac{2}{3} \) and \( \frac{2}{3} \)  
12) \( \frac{12}{7} \) and \( 1 \frac{1}{7} \)
Day 5 Classwork/Homework

Determine if the following numbers are prime, composite or neither.
1) 33  2) 23  3) 3  4) 7  5) 49  6) 18  7) 1

Find the GCF using prime factorization if necessary.
8) 15 and 10  9) 9 and 12  10) 2 and 6
11) 30 and 42  12) 36 and 144  13) 8 and 24
14) $\frac{4}{3}$ and $\frac{4\frac{2}{3}}{3}$
15) $1\frac{3}{5}$ and $\frac{6}{5}$
Lesson 6
Factoring

AIM: I can find the GCF and use that to factor a polynomial.

Warm Up: Find GCF of each set of numbers:

1) 10 and 25  2) 10 and 18  3) 24 and 36  4) 20 and 40  5) $\frac{4}{5}$ and $\frac{8}{5}$

Vocabulary:

Greatest Common Factor (GCF): ______________________________________________________________

Factoring: _________________________________________

Factoring Steps:

1. Find the GCF of all terms
2. Write the GCF outside of the set of parentheses
3. Divide each term by the GCF

Examples:

Factor:  $6x + 9$  $5x - 15$

Factor:
6) $10x + 25$  7) $7x + 14$  8) $16x - 12$  9) $30x + 45$

10) $24x - 32$  11) $10 - 18x$  12) $15x - 25$  13) $3x - 3$
Find the missing side of the rectangle given the area:

16) \( \text{Area} = 12x + 9 \)

17) \( \text{Area} = 18x - 45 \)

Try These:

Factor:

1) \( 4x + 6 \) 
2) \( 18 - 9x \) 
3) \( 8x - 10 \) 
4) \( 15x + 20 \) 
5) \( 2x - 5 \) 
6) \( 24x - 32 \) 
7) \( 12x - 48 \) 
8) \( 10x - 10 \) 
9) \( \frac{3}{5}x + \frac{6}{5} \) 
10) \( \frac{6}{7}x - \frac{1}{7} \) 
11) \( \text{Area} = 21x + 28 \)
Lesson 6 – Classwork/Homework

Factor:

1) $8x - 8$
2) $10 - 6x$
3) $4x - 16$
4) $9x + 12$
5) $5x - 10$
6) $12x + 12$

7) $\frac{5}{6}x - \frac{10}{6}$
8) $\frac{2}{3}x + 2\frac{2}{3}$

Find the missing side of the rectangle given the area:

9) Area = $81x + 18$

10) Area = $25x - 40$

11) Area = $24x - 12$

12) Area = $18x + 81$
Lesson 7
Adding and Subtracting Expressions

**AIM:** I can simplify polynomials by combining like terms.

**Warm Up:**

---

**Example 1:** What is the sum of $(6x^2 + 5x - 3) + (x^2 - 9)$?

Rewrite the expressions clearing the parentheses. Then combine like terms.

$$6x^2 + 5x - 3 + 1x^2 - 9 = 7x^2 + 5x - 12$$

**Example 2:** Find the difference of $(3p - 5) - (p + 4)$.

We need to distribute the negative (-1) to the second expression to clear the parentheses. Then combine like terms.

$$(3p - 5) - (p + 4) = 3p - 5 - 1p - 4 = 2p - 9$$

**Examples:**

1) $(4p + 2) + (p - 9)$  
2) $(2x^2 + 5x + 7) + (3x^2 - 4x - 1)$
3) \((5p + 4) + (p - 10)\)  

4) \((3x^2 + 2x + 9) + (4x^2 - 5x - 6)\)

4) \((4x^2 + 2x + 4) - (3x^2 - x + 6)\)  

5) Subtract \(8x + 10\) from \(14x + 15\).

6) \((3x^2 - 5x + 2) - (5x^2 - x + 3)\)  

7) Subtract \(9x + 12\) from \(10x + 19\).

**Try These:**

1) \((10x - 4) + (x - 2)\)  

2) \((4x^2 - 6) - (2x^2 + 1)\)  

3) \((4x + 4) + (-5x + 1)\)
Lesson 7 – Classwork/Homework

Simplify the following expressions:

1) \((5x + 1) + (-2x - 3)\)  
2) \((8x - 2) - (-4x + 1)\)  
3) \((6x^2 + 2x + 9) + (x^2 - 4x - 12)\)

4) \((x^2 - 5x + 13) - (4x^2 - 5x - 7)\)  
5) \((7x^2 + x - 4) + (11x^2 - 8x + 5)\)

6) Subtract \(12x + 5\) from \(10x - 2\).
7) Subtract \(4x^2 + 9x\) from \(2x^2 + 3x\)
8) Katy wants to simplify the subtraction expression shown below:

\[(2mn - 5m^2) - (4n^2 + 3mn - m^2)\]

Which of the following expressions is equivalent to this subtraction expression?

A  \(2mn - 5m^2 - 4n^2 + 3mn - m^2\)
B  \(2mn - 5m^2 - 4n^2 - 3mn + m^2\)
C  \(-2mn + 5m^2 - 4n^2 + 3mn + m^2\)
D  \(-2mn + 5m^2 - 4n^2 - 3mn + m^2\)

9) What is the sum of the expression below?

\[(8p + q + 5) + (p + q - 7)\]

A  \(8p + q + 2\)  B  \(8p + q - 2\)  C  \(9p + q - 2\)  D  \(9p + 2q - 2\)

10) What is the GCF of \(45x^2 + 18\)?

A  \(6\)  B  \(9\)  C  \(18\)  D  \(45\)

11) Which expression has a GCF of 6?

A  \(6w^2 + 8\)  B  \(12w^2 - 3\)  C  \(24w^2 + 36\)  D  \(30w^2 - 18\)
Lesson 8
Translating Expressions

AIM: I can verbal phrases into mathematical expressions.

Warm Up:

<table>
<thead>
<tr>
<th>Addition Phrases</th>
<th>Expression</th>
<th>Subtraction Phrases</th>
<th>Expression</th>
</tr>
</thead>
<tbody>
<tr>
<td>*8 more than a number</td>
<td>x + 8</td>
<td>*6 less than a number</td>
<td>r - 6</td>
</tr>
<tr>
<td>The sum of a number and 8</td>
<td></td>
<td>*6 subtracted from a number r</td>
<td></td>
</tr>
<tr>
<td>x plus 8</td>
<td></td>
<td>r minus 6</td>
<td></td>
</tr>
<tr>
<td>x increased by 8</td>
<td></td>
<td>r decreased by 6</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Multiplication Phrases</th>
<th>Expression</th>
<th>Division Phrases</th>
<th>Expression</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 multiplied by n</td>
<td>4n</td>
<td>A number divided by 3</td>
<td>( \frac{z}{3} )</td>
</tr>
<tr>
<td>4 times a number</td>
<td></td>
<td>The quotient of z and 3</td>
<td></td>
</tr>
<tr>
<td>The product of 4 and n</td>
<td></td>
<td>The ratio of z and 3</td>
<td></td>
</tr>
</tbody>
</table>

Examples: Write each verbal phrase as an algebraic expression

1) The sum of 8 and x
2) The quotient of g and 15
3) The product of 5 and b
4) p increased by 10
5) 14 less than f
6) The difference of 32 and x
7) Twice Sue’s height
8) Four times John’s score
9) Eight less than Amy’s shoe size
10) The taxi fare of $.50 for each mile

11) 5 more than 3 times a number

12) The quotient of 5 and x decreased by 8

13) A cab ride has a flat fee of $3 plus $0.50 per mile. Write an expression to represent this situation.

**Try These:** Write each verbal phrase as an algebraic expression

1) The cost of 7 CDs at $d each

2) The height decreased by 2 inches

3) A number divided by 5

4) The total of Ben’s score and 75

5) 2 hours more than the estimated time

6) 14 more than s

7) $500 less than the sticker price

8) 25 times the number of students

9) The score increased by 8 points

10) The cost split among 4 people
11) 8 less than the product of 10 and x

12) The quotient of x and 4 plus 12

13) A plumber charges a flat rate of $50 plus $25 for each additional hour. Write an expression to represent this situation.

14) You watch x minutes of television on Monday, the same amount on Wednesday, and 30 minutes on Friday. Express the situation in simplest form.

15) Colleen and her friends paid a total of $7 for tickets to the school football game. While at the game, they bought 5 hotdogs at x dollars each, 4 boxes of popcorn at y dollars each, and 2 pretzels at z dollars each.

   a) Write an expression to show the total cost of admission and the snacks.

   b) Hot dogs cost $4, popcorn cost $3, and pretzels cost $2. What was the total cost for admission and snacks?
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Lesson 8 - Homework</strong></td>
<td></td>
</tr>
<tr>
<td>Write each verbal phrase as an algebraic expression.</td>
<td></td>
</tr>
<tr>
<td>1) The number divided by 5</td>
<td>2) The sum of x and 7</td>
</tr>
<tr>
<td>3) The product of 10 and c</td>
<td>4) 6 less than x</td>
</tr>
<tr>
<td>5) Twice y</td>
<td>6) The difference of t and 1</td>
</tr>
<tr>
<td>7) 17 more than a number</td>
<td>8) The quotient of z and 10</td>
</tr>
<tr>
<td>9) The number of members divided by 5</td>
<td>10) The total of Josh’s savings and $350</td>
</tr>
<tr>
<td>11) The total area decreased by 75 sq ft</td>
<td>12) The cost of 10 books at $d each</td>
</tr>
<tr>
<td>13) Sue’s height plus 2 inches</td>
<td>14) The cost split among 5 friends</td>
</tr>
<tr>
<td>15) Five increased by a number</td>
<td>16) Triple John’s weight</td>
</tr>
<tr>
<td>17) The quotient of x and 5</td>
<td>18) Seven less than y</td>
</tr>
<tr>
<td>19) 10 increased by 2 times a number</td>
<td>20) 8 less than the quotient of x and 2</td>
</tr>
<tr>
<td>21) The product of 3 and a number minus 4</td>
<td>22) 6 times the sum of x and 4</td>
</tr>
<tr>
<td>23) A carnival has an entrance fee of $10 plus $2 for each ride. Write an expression to represent this situation.</td>
<td>90</td>
</tr>
</tbody>
</table>
Lesson 1:
Define the following AND give an example of each:

**Monomial:**

**Binomial:**

**Trinomial:**

**Polynomial:**

State the operation represented by each:

<table>
<thead>
<tr>
<th>Sum</th>
<th>Product</th>
<th>Quotient</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) \(5x^3 + 4\)  
   \(x\) is the _________  
   5 is the _________  
   3 is the _________  
   4 is the _________

2) Classify the following expressions as a Monomial, Binomial or Trinomial.
   a) \(9x + 3y\)  
   b) \(10xz\)  
   c) \(-2\)  
   d) \(7\)  
   e) \(15abc\)  
   f) \(14x + 4y - 3\)

3) State whether the given terms are like terms or not like terms.
   a) \(8a\) and \(-4a\)  
   b) \(12\) and \(3\)  
   c) \(12xy\) and \(2xz\)  
   d) \(3x\) and \(x\)  
   e) \(4x\) and \(4\)

Simplify each expression.

4) \(2x + x\)  
5) \(8y + 4 + 7\)  
6) \(3x + 5y\)  
7) \(x + 3 + x + 15\)

8) \(5.6x + 2 + 9.1x\)  
9) Find the perimeter

\[\text{Perimeter} = 6 \times (x + 3)\]
Lesson 2: Simplify each expression.
10) \(-8x + 8x\)  
11) \(4y - 10y + y\)  
12) \(-\frac{1}{3}x + 9 - 3\frac{4}{9}x + 10\)  
13) \(-3.9x + 2 + 4.5x\)

Lesson 3: Simplify each expression.
14) \(3(5x + 1)\)  
15) \(-2(3x - 2)\)  
16) \(-(7x + 4)\)  
17) \((-x + 2)3\)  
18) \(-(8x + 9)\)

19) \(\frac{1}{3}(12x - 6)\)  
20) \(\frac{1}{2}(20x + 10)\)  
21) \(\frac{1}{5}(20x + 15)\)  
22) Find the area

Lesson 5 and 6:
Find the GCF of the numbers given:
22) 20 and 28  
23) 16 and 32  
24) 40 and 45

Factor:
25) \(8x + 10\)  
26) \(12 - 16x\)  
27) \(25x + 30\)  
28) \(10x + 50\)  
29) \(3x - 9\)

Lesson 4 and 7: Simplify
30) \(5x + 4(2x + 7)\)  
31) \(-(x - 5) + 4x\)  
32) \((3x + 10) + (5x - 4)\)

33) \((5x - 14) - (2x + 6)\)  
34) \((x + 8) - (-2x - 7)\)
Lesson 8: Translate each expression

35) The difference of x and 4
36) The quotient of a number (n) and 15
37) 5 decreased by y

38) The product of 32 and x
39) 5 more than twice a number
40) Six times the sum of x and 3

41) Four less than five times a number (x).
42) $20 divided among (x) students.

43) 30 less than five times x.

44) A painter charges a flat rate of $100 plus $20 for each hour of work. Write an expression to represent this situation.

45) The aquarium charges a $30 entrance fee plus $10 for each additional activity. Write an expression to represent this situation.

Review: Simplify

46) $-1 + 10$
47) $-5 - 9$
48) $20 ÷ 2 \cdot 5$

49) $\frac{10 ÷ 2}{4^2 - 14}$
50) $4 \cdot -5$
51) $1.2 \cdot 3$
# Unit 4
## Equations

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Lesson 1
One-Step Equations

AIM: I can solve one step equations by isolating the variable.

Warm Up:

Vocabulary

Inverse Operations: _________________________________________________________________________

*Remember, whatever you do to one side of an equation ____________________________________.

Rules:
1)  __________________________________
2)  __________________________________
3)  __________________________________
4)  __________________________________

Examples:
1)  $x + 3 = 4$  check  
   2)  $h - 18 = 25$  check

3)  $3m = 27$  check  
   4)  $\frac{x}{2} = 15$  check

5)  $6 = x + 2$  check  
   6)  $12 + x = -10$  check
7) \(-5x = 40\) \hspace{1cm} \text{check} \hspace{1cm} 8) \(b - 3 = -7\) \hspace{1cm} \text{check}

**Try These: (show all work)**

1) \(x - 3 = 12\) \hspace{1cm} 2) \(4t = 16\) \hspace{1cm} 3) \(n + 6 = 6\) \hspace{1cm} 4) \(8 = k + 7\)

5) \(e - 9 = 10\) \hspace{1cm} 6) \(12 = p + 30\) \hspace{1cm} 7) \(y + 16 = 26\) \hspace{1cm} 8) \(5 + r = 10\)

9) \(9 + w = 19\) \hspace{1cm} 10) \(-6x = 36\) \hspace{1cm} 11) \(s + 6 = 4\) \hspace{1cm} 12) \(5 = d + 10\)

13) \(n - 12 = -8\) \hspace{1cm} 14) \(b + 44 = -7\) \hspace{1cm} 15) \(b + 7 = 6\) \hspace{1cm} 16) \(d - 22 = 45\)

17) \(r + 88 = 333\) \hspace{1cm} 18) \(m + 736 = 542\) \hspace{1cm} 19) \(t - 121 = -111\) \hspace{1cm} 20) \(k - 88 = -68\)
Lesson 1 - Homework

Solve for x: (show all work)

1) \( g - 10 = 12 \)  
2) \( \frac{x}{7} = 3 \)  
3) \( w + 21 = 50 \)  
4) \( 18 = j + 9 \)

5) \( m - 10 = -5 \)  
6) \( 14 = n + 7 \)  
7) \( c - 7 = -12 \)  
8) \( x + 4 = -10 \)

9) \( p + 15 = -5 \)  
10) \( 5m = 25 \)  
11) \( n - 12 = -36 \)  
12) \( g + 55 = 11 \)

13) \( f + 77 = -75 \)  
14) \( 789 - m = 7 \)  
15) \( w + 97 = 132 \)  
16) \( q + 33 = -30 \)

17) \( 444 - j = 258 \)  
18) \( 250 = 47 + x \)  
19) \( a + 745 = -55 \)  
20) \( s - 4654 = 477 \)
Lesson 2
Two-Step Equations

AIM: I can solve two step equations by isolating the variable.

Warm Up:

Vocabulary:
Inverse Operations - _____________________________________________________________

*Remember, whatever you do one side of an equation__________________________________

Rules:
1) ___________________________________________________________________________
2) ___________________________________________________________________________
3) ___________________________________________________________________________
4) ___________________________________________________________________________

Examples:
1) $2x + 4 = 8$ 2) check #1 3) $7 + 2x = 9$ 4) $\frac{x}{2} + 5 = 13$
5) $2x + 2 = 8$ 6) check #5 7) $5 + 2x = 11$ 8) $4 - x = 12$
Try These:
1) \(3x - 8 = -32\)  
2) \(\text{check #1}\)  
3) \(-5x + 5 = -45\)  
4) \(\frac{x}{-5} + 2 = 12\)

5) \(2x + 4 = 26\)  
6) \(\text{check #5}\)  
7) \(\frac{x}{5} + 2 = 12\)  
8) \(\frac{x}{2} - 7 = 8\)

9) \(3x + 5 = 38\)  
10) \(\text{check #9}\)  
11) \(2x + 30 = 50\)  
12) \(5x - 7 = 52\)

13) \(-5x + 20 = 55\)  
14) \(\text{check #13}\)  
15) \(\frac{x}{10} - 3 = -7\)  
16) \(\frac{x}{9} - 3 = -1\)

17) \(\frac{x}{3} + 6 = 2\)  
18) \(\text{check #17}\)  
19) \(6x + 6 = 12\)  
20) \(3x - 10 = 11\)
Lesson 2 - Homework

1) 3x + 2 = 26
2) \textit{check} #1
3) \frac{x}{5} + 2 = 7
4) \frac{x}{2} - 7 = 7

5) 7x - 5 = 44
6) \textit{check} #5
7) 2x + 30 = -100
8) 10x - 14 = 104

9) -7x + 20 = 55
10) \textit{check} #9
11) \frac{x}{10} - 10 = 10
12) \frac{x}{9} - 3 = 0

13) \frac{x}{3} + 1 = 2
14) \textit{check} #13
15) \frac{x}{6} + 7 = -5
16) \frac{x}{-2} - 6 = 3
Lesson 3  
Two-Step Equations - Day 2

AIM: I can solve two step equations by isolating the variable.

Warm Up:

Examples: (show all work)

1) \(2x + 4 = 8\)  
2) \(4y + 3 = 15\)  
3) \(5 - 2x = 9\)  
4) \(\frac{x}{2} + 5 = 17\)

Check:  
Check:  
Check:  
Check:

Try These: (show all work)

1) \(2x - 2 = 12\)  
2) \(3x - 12 = 12\)  
3) \(5x + 6 = 21\)  
4) \(\frac{x}{3} + 7 = 16\)
5) $-x - 9 = 10$  
6) $-7x + 2 = -19$  
7) $4x + 10 = 26$  
8) $4 + 3x = 13$

9) $9 - 5x = 19$  
10) $3x - 17 = 10$  
11) $\frac{x}{5} + 10 = 15$  
12) $-11 = 3x + 10$

13) $\frac{x}{2} - 3 = -11$  
14) $2x - 1 = -1$  
15) $9x + 7 = -11$  
16) $3x + 8 = -10$

17) $-5 = 2x - 15$  
18) $2 - \frac{x}{8} = 0$  
19) $\frac{x}{6} - 1 = 7$  
20) $-x - 12 = -8$

Lesson 3 - Homework

1) $4x - 4 = 12$  
2) $2x - 12 = 10$  
3) $3x + 4 = 25$  
4) $\frac{x}{3} + 6 = 10$
5) \(-x - 15 = 10\)  
6) \(10 = -2x + 6\)  
7) \(-2x + 12 = -26\)  
8) \(14 + 10x = 4\)

9) \(-y + 7 = 11\)  
10) \(3x - 12 = 6\)  
11) \(\frac{x}{5} + 15 = 15\)  
12) \(-3 = 3x - 30\)

13) \(5x - 3 = -13\)  
14) \(2x + 1 = -5\)  
15) \(9x + 8 = 71\)  
16) \(2x - 8 = -6\)

Review & Simplify the following:

17) \(\frac{1}{3}(4 + 3^2 - 1)\)  
18) \(7a + 2a + a\)  
19) What is the constant of \(3x - 1\)?

20) \(12 - (-5)\)  
21) \(12 - \left| -5 \right|\)  
22) \(2 \frac{3}{7} + 3 \frac{1}{2}\)

23) The lowest temperature ever recorded in New York City was -15 degrees Fahrenheit on February 9, 1934. The highest temperature recorded was set as high as 106 °F on July 9, 1936 in Central Park. What is the difference between these two temperatures?
AIM: I can simplify each side of the equation by combining like terms and then isolate the variable.

Warm Up:

What are some important things to remember when we are combining like terms?
- Must have the same Variable and Exponent
- Make sure you include the sign.

Review

1) Can we combine 2d and 8d? _______ Why? ________________
2) Can we combine 2 and 8d? _______ Why? ____________________

Steps to Success

Step 1: Make a shape around the terms that have the same variable.

Example: 5k + 8m + 3k - 7m

It is super important that you take the sign in front of the coefficient!

When there are like terms on the same side of an equation, you must combine them first!!

Examples:

1) 3x + 4x = 49  
2) 9x + x = 60  
3) 6x - 3x = 18  
4) 4x + x = 25
5) $8x - 3x + 15 = 45$
6) $3x - 7 = -5 - 8$
7) $4x + 20 = 50 - 10$
8) $\frac{x}{10} + 3 = 2 - 4$

Try These:

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<tbody>
<tr>
<td>1) $2x + 4 = 5 + 9$</td>
<td>2) $2x + 5x - 4 = 17$</td>
<td>3) $2x + 6 + x = 36$</td>
<td>4) $3x - 7 = 10 + 4$</td>
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<tr>
<td>5) $\frac{x}{5} + 2 = 10 + 2$</td>
<td>6) $\frac{x}{2} - 7 = 4 + 4$</td>
<td>7) $4x + 5 + x = 55$</td>
<td>8) $\frac{x}{9} - 3 = 1 + 2$</td>
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<tr>
<td>9) $2x + 3x = 25$</td>
<td>10) $7x - x = 24$</td>
<td>11) $5x - 2x = 18$</td>
<td>12) $9x - x = 16$</td>
</tr>
<tr>
<td>13) $-2x + 3 + 3x = 34 + 4$</td>
<td>14) $2x - 14 + 5x = 20 + 1$</td>
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Lesson 4 - Homework

Solve for $x$:

1) $2x + x = 27$  
2) $7x + 2x = 45$  
3) $5x + 2x = 56$  
4) $3x + x = 16$

5) $9x + 2x + 16 = 38$  
6) $2x + 4x - 5 = 13$  
7) $4x + 10 + x = 35$  
8) $3x + 8 + x = 48$

9) $-5x + 3 = 2 - 9$  
10) $-5x + 7 = 5 + 12$  
11) $7x + 20 = 65 - 10$  
12) $9x - 7 = 11 + 9$

13) $\frac{x}{5} + 3 = 19 - 6$  
14) $\frac{x}{3} + 7 = -1 - 4$  
17) $-6x + 3 - 2x = 59$  
18) $9x - 19 + x = 21$

Review

19) Find the perimeter: _____________  

20) Translate: A number $m$ less than a number $h$

21) $9(3 - 2 \cdot 4)$
Lesson 5
Combine Like Terms with Negatives

AIM: I can simplify each side of the equation by combining like terms with negatives and then isolate the variable.

Warm Up:

What are some important things to remember when we are combining like terms?
- Must have the same Variable and Exponent
- Make sure you include the sign.

**When there are like terms on the same side of an equation, you must combine them first**

Examples:
1) $-21x - 6x = 54$
2) $5y - 10y + 6y = 22$
3) $m - 9m + 6m - 7m = -72$

Try These:
1) $-7p + -3p = 200$
2) $9k - 15k + 2k = 16$
3) $15y - 10y + 3y = -64$
4) $14x - 10x - 7x + x = 44$

5) $12y + 8y - 25y = -40$

6) $16y + 18y - 10y + 2y = 78$

7) $-27 = 2x - 7 - 6x$

8) $-8x - 8 - x = 5 + 5$

9) $3x - 4x - 3 = 18$

10) $3x - 5x + 16 = 32$

11) $2x - 4x - 6 = 18$

12) $2x + 3 - 3x = 34 + 4$
Lesson 5 - Homework

**Solve:**

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<tbody>
<tr>
<td>1) $-20 = -4x - 6x$</td>
<td>2) $6 = 1 - 2n + 5$</td>
<td>3) $-2 = -9 + 7x - 8x$</td>
</tr>
<tr>
<td>4) $a - 5a + 5 = 21$</td>
<td>5) $8m - 6 - 14m = -42$</td>
<td>6) $-1 = 4p + 3p - 8$</td>
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<tr>
<td>7) $-3x = -12 - 6$</td>
<td>8) $14 = -p + 8$</td>
<td>9) $-7 + 4x = 9$</td>
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<tr>
<td>10) $5p - 8p = 4 + 14$</td>
<td>11) $-4 = -9 + p - 6p$</td>
<td>12) $2x - 3x = 55 - 3$</td>
</tr>
<tr>
<td>13) $-5 = -48 - 40n - 3n$</td>
<td>14) $-1 - 7x + 42 + x = 36$</td>
<td>15) $-12x - 9 + 24x = 39$</td>
</tr>
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</table>
Lesson 6
Solving with Distribution

AIM: I can simplify each side of the equation by distributing and then isolate the variable.

Warm Up:

Steps:
1. Distribute (If possible)
2. Combine Like Terms on Each Side
3. Isolate The Variable (Inverse Operations)

Examples:

1) $3(x + 4) = 60$
2) $30 = 2(x + 5)$
3) $2 + 2(x - 4) = 14$
4) $2(5 - 2x) = 21$

5) $3 + 2(3x - 10) = 7$
6) $3(x - 7) = 9$
7) $5(2x - 5) = 55$
8) $2(2x + 4) = 20$

9) $3(x + 2) = 27$
10) $7(2x - 5) = 35$
11) $4(x + 5) = 40$
12) $5(2x + 6) = 40$
### Try These:

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<tbody>
<tr>
<td>13) (8 + 2(x + 5) = 16)</td>
<td>14) (3(x + 3) = 21)</td>
<td>15) (2 + 3(6 - 5x) = 50)</td>
<td>16) (30 = 2(x + 5))</td>
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<tr>
<td>17) (9 = 2(x - 3))</td>
<td>18) (3(x - 3) = 6)</td>
<td>19) (2(4x + 1) = 14)</td>
<td>20) (2(5x + 4) = 48)</td>
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<tr>
<td>21) (60 = 3(x + 9))</td>
<td>22) (3(4x + 2) = 30)</td>
<td>23) (4(x + 2) = 24)</td>
<td>24) (54 = 6(2x + 1))</td>
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### Lesson 6 - Homework

**Solve:**

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<tbody>
<tr>
<td>1) (6(2x + 4) = 60)</td>
<td>2) (60 = 4(x + 5))</td>
<td>3) (14 + 4(5 - 2x) = 50)</td>
<td>4) (6(x - 3) = 12)</td>
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<tr>
<td>5) (6 + 4(3x - 10) = 14)</td>
<td>6) (5(x - 7) = 10)</td>
<td>7) (-20 = 2(x + 5))</td>
<td>8) (2(x + 5) = 0)</td>
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</tbody>
</table>
9) \(4(x + 2) = 28\)  
10) \(45 = 3(2x - 5)\)  
11) \(2(x + 5) = 20\)  
12) \(40 = 4(2x + 6)\)  

13) \(16 + 4(x + 5) = 32\)  
14) \(6(x + 3) = 42\)  
15) \(4 + 6(6 - 5x) = 100\)  
16) \(12 = 4(x + 8)\)  

**Review:**  
17) \(3x + 9 + x = 49\)  

18) \(50 = 10x - x + 23\)  

19) \(-24 = 6x - 15 - 5x - 1\)
Lesson 7
Solving with Distribution of Negatives

AIM: I can simplify each side of the equation by distributing with negatives and then isolate the variable.

Warm Up:

Steps:
1. Distribute (If possible)
2. Combine Like Terms on Each Side
3. Isolate The Variable (Inverse Operations)

Examples:
1) $2(x + 5) = 26$
2) $-(x - 3) = -7$
3) $-5(x + 4) = 45$
4) $-21 = -7(x - 3)$
5) $22 = 2(3x - 10)$
6) $-3(6x - 4) = -24$
7) $110 = 10(2x - 5)$
8) $-4(2x + 4) = 40$
9) $2(x + 2) = 14$
10) $-3(4x - 5) = 39$
11) $-4(x + 5) = 40$
12) $80 = 5(2x + 6)$

**Try These:**

13) $8 = -2(x + 2)$
14) $-3(x + 3) = 21$
15) $60 = -3(x - 4)$
16) $-2(x - 3) = 20$

17) $-(x + 4) = 10$
18) $-(x - 3) = 7$
19) $-2(4x + 1) = 14$
20) $-3(2x + 2) = 6$

21) $3(2x - 4) = -24$
22) $-4(2x + 6) = 16$
23) $4(x - 2) = -20$
24) $-(8x - 2) = 18$
### Lesson 7 - Homework

**Solve:**

1) \(-2(x + 3) = 10\)  
2) \(25 = -5(x + 2)\)  
3) \(-3(x - 2) = 27\)  
4) \(28 = -7(x - 2)\)

5) \(8 = -(x + 2)\)  
6) \(-(-3x - 2) = 11\)  
7) \(-2(3x + 2) = 2\)  
8) \(-5 = -5(x - 3)\)

9) \(-2(x + 8) = 44\)  
10) \(30 = 5(x - 4)\)  
11) \(-3(x + 4) = 27\)  
12) \(9(x - 2) = 9\)

13) \(5(2x - 4) = 20\)  
14) \(24 = 3(2x - 4)\)  
15) \(5(2x - 5) = 65\)  
16) \(-6 = -2(x + 2)\)

**Review:**

17) \(x + 4x = 35\)  
18) \(4x + 8 = 10 + 18\)  
19) \(7x + 5 = 61\)  
20) \(\frac{x}{3} - 2 = 10\)

21) \(6x + 4 + x = 53\)  
22) \(3(x + 4) = 48\)  
23) \(4(5x - 2) = 32\)  
24) \(2(2x + 4) = 24\)
Lesson 8
Equations with Decimals

AIM: I can solve equations with decimals.

Warm Up:

Steps:  
1. Distribute (If possible)  
2. Combine Like Terms on Each Side  
3. Isolate The Variable (Inverse Operations)

Examples:
1) $2.5 + x = 10.5$  
2) $.5x + 2x - 4 = 6$  
3) $10.6 = x - 7.4$

4) $.5 + .2x = .9$  
5) $4.5 + x = 12$  
6) $.9 - 10x = -9.1$
7) \(0.3x = 9\)  
8) \(0.23x + 0.37x - 0.1x = 2 - 0.41\)  
9) \(-20 = 0.2(10x - 30)\)

Try These:

10) \(z + 1.25 = -9.54\)  
11) \(c - 14.59 = -88.22\)  
12) \(14.9 - x = 15.1\)

13) \(2t + 9.4 = 39.8\)  
14) \(3.25k + 5.75k = 72\)  
15) \(7a = 1.4\)

16) \(0.5(2x + 3) = 4.5\)  
17) \(3x = -2.4\)  
18) \(0.25(12x + 8) = 17\)
Lesson 8 - Homework

1) \[ 9 - 79.2 = x \]  
2) \[ -1.30 + v = -9.3 \]  
3) \[ b + 4 = 25.65 \]

4) \[ n - 14 = -7.7 \]  
5) \[ q + 11.25 = 5.3 \]  
6) \[ -4x = 16 \]

7) \[ 3y + 13.6 = 40.6 \]  
8) \[ g - 1.68 = -34.44 \]  
9) \[ .5x + 2x - 4 = 6 \]

10) \[ 138.75 = 9.25(-6 + t) \]  
11) \[ 21 = .5(4x + 6) \]  
12) \[ -.2(10x - 15) = 9 \]

Review:

13) Sal did the following work:  
   Explain his error.  
   \[ 9y - 2 + 4y \]  
   \[ 9y - 4y + 2 \]  
   \[ 5y + 2 \]

14) Today it is 25\(^\circ\). Last month, it was -15\(^\circ\).  
   What was the difference in temperature?

15) \$25.99 - \$217.47 \]
Lesson 9
Equations with Fractions

AIM: I can solve equations with fractions.

Warm Up:

Examples:

1) \( \frac{j - 3}{5} = \frac{1}{5} \)  
2) \( h - \frac{3}{8} = \frac{1}{8} \)  
3) \( g + \frac{1}{9} = \frac{4}{9} \)  
4) \( \frac{5}{6} x - \frac{1}{6} x = 8 \)

5) \( 50 = \frac{2}{3} (3x + 6) \)  
6) \( 54 = \frac{2}{3} (6x - 9) \)  
7) \( \frac{1}{2} (2x + 2) = 48 \)  
8) \( \frac{1}{3} (9x - 12) = -25 \)

Try These:

1) \( \frac{5}{8} + x = \frac{3}{4} \)  
2) \( h + \frac{15}{25} = \frac{13}{50} \)  
3) \( x - \frac{30}{40} = \frac{5}{20} \)  
4) \( 2x + \frac{1}{4} = \frac{1}{8} \)
5) \( \frac{1}{4} (12x + 8) = 17 \)
6) \(-20 = \frac{1}{5} (10x - 30) \)
7) \( \frac{1}{6} (6x - 18) = -4 \)
8) \( 20 = \frac{1}{2} (4x + 8) \)

9) \( \frac{2}{3} (6x + 9) = 22 \)
10) \( 24 = \frac{3}{5} (5x + 10) \)
11) \( \frac{1}{3} (3x - 6) = 9 \)
12) \( -\frac{1}{5} (10x - 15) = 9 \)

---

**Lesson 9: Homework**

1) \( f + \frac{1}{7} = -\frac{1}{7} \)
2) \( x + \frac{6}{15} = \frac{5}{15} \)
3) \( \frac{2}{3} y - \frac{1}{3} y = 33 \)
4) \( m - \frac{3}{4} = \frac{1}{2} \)

5) \( \frac{1}{2} = d + \frac{5}{12} \)
6) \( \frac{3}{4} + p = \frac{3}{20} \)
7) \( \frac{1}{4} y + \frac{1}{3} = \frac{1}{12} \)
8) \( k - \frac{4}{7} = \frac{1}{4} \)
13) Drew made fruit punch for 12 people. The punch contains sparkling water and \(\frac{2}{3}\) of a pint of fruit juice per person. If there are \(10\frac{2}{5}\) pints of fruit punch, how many pints of sparkling water did Drew add per person?

**Review**

*Write and solve an equation for each:*

14) A tile man is laying an 84 inch border using 12 inch tiles. How many tiles would need to be placed?

15) Student Government sold 175 bags of popcorn at the dance. If they made $306.25, how much was the cost of each bag of popcorn?
Lesson 10
Translate and Solve

AIM: I can translate verbal sentences and then solve the mathematical equation.

Warm Up:

Vocabulary for each operation

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**Switch Words**

*Translate each sentence into an equation, and then solve the equation.*

1) Six more than a number is 12.

2) Three times a number is 21.
3) Seven less than a number is 20.

4) Five more than twice a number is 7.

5) Six less than half of a number is 12.

6) The product of a number and three-fourths is 12.

7) Six more than four times a number is -9.

8) The difference between 12 and ten times a number is 52.
Lesson 10 – Classwork/Homework

1) Eleven less than 5 times a number is 24.  
2) The quotient of a number and $-9$ increased by 10 is 11.

3) Fifteen more than twice a number is $-23$.  
4) Five less than the product of $-3$ and a number is $-2$.

5) Nine more than $-8$ times a number is $-7$.  
6) The difference between 5 times a number and 4 is 16.

7) Eleven less than five times a number is 19.  
8) Thirteen more than four times a number is $-91$.

9) Three times half of a number is 21.  
10) Twelve less than the quotient of a number and 8.4 is $-9$.

11) While at the music store, Drew bought 5 CD’s all at the same price. The tax on his purchase was $6 and the total was $61. Write an equation to represent this situation and solve.

12) A taxi service charges $1.50 plus $0.60 per minute for a trip to the airport. The total charge is $13.50. How many minutes did the ride to the airport take?
<table>
<thead>
<tr>
<th></th>
<th>Equation</th>
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<tbody>
<tr>
<td>1</td>
<td>$2 + x = 10$</td>
<td>2</td>
<td>$x - 7 = 3$</td>
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<td>6</td>
<td>$7m + 3 = 10$</td>
<td>7</td>
<td>$\frac{x}{7} - 2 = 4$</td>
<td>8</td>
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<td>9</td>
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<tr>
<td>10</td>
<td>$2x + 9x = 44$</td>
<td>11</td>
<td>$3r + 5r = 24$</td>
<td>12</td>
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<tr>
<td>13</td>
<td>$6c + 12 = 22 + 20$</td>
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<tr>
<td>14</td>
<td>$3(5z - 2) = 24$</td>
<td>15</td>
<td>$2(3x + 2) = 13 + 15$</td>
<td>16</td>
</tr>
<tr>
<td>17</td>
<td>$-4(2h + 2) = 16$</td>
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</table>
18) $5y + 3 - y = -41$  
19) $\frac{x}{3} - 5 + 11 = -12$  
20) $\frac{1}{5}(5x - 15) = 32$  
21) $\frac{2}{3}(6x - 18) = 16$

22) $0.5x - 1.5 = 8.5$  
23) $-3.7 - 0.7x = -5.8$  
24) $3.2x + 1.8x + 4.2 = 15.2 + 4$

25) $\frac{5}{6}x - \frac{1}{6}x = 8$  
26) $7x - (3x - 6) - 2 = -20$  
27) $-10 - 2 = \frac{1}{2}(4x - 4) - 4x$

Write and solve an equation for each:

28) Three times a number is 21.  
29) Seven less than a number is 20.

30) Eleven less than five times $c$ is 19.  
31) Thirteen more than four times a number is $-91$.  

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32) Three times the sum of a number and 2 is 27.  
33) Five less than the product of $-3$ and a number is $-2$.  

34) Nine more than $-8$ times a number is $-7$.  
35) Five more than twice a number is 7.  

36) Sally loves to text her friends. Her cell phone company charges her $0.05 per text. She has to pay a connection fee of $25 a month. Sally can only afford to pay $40 a month. What is the greatest number of texts she can send/receive per month?  

37) Kelly is renting a car and is charged $120 for the day plus $0.25 for each mile driven. Write an equation of the situation. Find out how many miles can be driven if Kelly is going to pay $170.  

**Review Chapters 1-3:**  
38) Mercury freezes at $-38^\circ$ F and boils at $674^\circ$ F. Find the difference between the two temperatures.
39) Drew made fruit punch for 12 people. The punch contains sparkling water and \( \frac{2}{3} \) of a pint of fruit juice per person. If there are \( 10\frac{2}{5} \) pints of fruit punch, how many pints of sparkling water did Drew add per person?

40) Student Government sold 175 bags of popcorn at the dance. If they made $306.25, how much was the cost of each bag of popcorn?

41) Evaluate the expression, if \( r = 5 \), \( s = 7 \), and \( t = 10 \).

\[
3(rs) - t
\]

42) Simplify:

a) \( 7x + 9x \)

b) \( -6x - x \)

c) \( \frac{3}{5} + \frac{9}{10} \)

d) \( \frac{4}{7} \)

43) \( (13.55)(-2.6) \)

44) \( 32.37 + 11.765 \)

45) \( 25.67 - 3.94 \)

46) \( \frac{-24}{3} \)