

9th Grade Assignments – Week #1

Individual Work

- Simply work through **Pre-Algebra** unit - **Problem Sets #3-6**. Look through the problems and work on the ones that you feel are helpful for you.

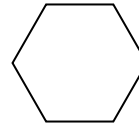
Group Assignment:

for Tuesday or Thursday

- (1) Try to figure out how the “Birthday Magic Trick” works (which I showed in the lecture).
- (2) Together a coffee and a donut cost \$3.35. The donut costs 40¢ less than twice the price of the coffee. Find the price of the donut.

- (3) Slicing a Hexagon.

How can a hexagon be cut into 4 pieces such that those pieces form two equilateral triangles?



- (4) Eight 8's.

How can you make eight 8's equal 1000? For example, we could do $(888) \div (88-8) + 8 \cdot 8$, but that would equal 75.1. Instead, it needs to equal 1000.

Problem Set #3

Simplify.

- 1) $23 - 34$
- 2) $34 - 23$
- 3) $-8 + 14$
- 4) $14 - 8$
- 5) $-33 - 10$
- 6) $35 + (-10)$
- 7) $-10 - -35$
- 8) 3^3
- 9) $3 \cdot 3$
- 10) $(-2)^2$
- 11) -2^2
- 12) $\left(\frac{3}{4}\right)^3$
- 13) $\frac{3}{7} \cdot 7$
- 14) $7\left(\frac{3}{7}\right)$
- 15) $7 \div \frac{3}{7}$
- 16) $\frac{3}{7} \div 7$
- 17) $\frac{3}{7} \div \frac{3}{7}$
- 18) $\frac{3}{4} + \frac{4}{7} - \frac{5}{28}$
- 19) $(-3)(-2)$
- 20) $8(-3)$
- 21) $4 \div -2$
- 22) $\frac{4}{-2}$
- 23) $\frac{-4}{2}$
- 24) $9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 \cdot 0$
- 25) $4^2 + 5 \cdot 8$
- 26) $9 + 18 \div 9$
- 27) $4 \cdot 10^2$
- 28) $(4 \cdot 10)^2$
- 29) $(3+4)^3$
- 30) $3^3 + 4^3$
- 31) $1 - 8(2+3^2)$
- 32) $120 \div 8 \div 2$
- 33) $8 + 3(2 - 2 \cdot 3^2) \div -8$
- 34) $\frac{1}{2} + \frac{3}{4} \cdot \frac{1}{5}$

- 35) $4\left(\frac{1}{3} + \frac{2}{9}\right) + 1$
- 36) $-1(3+4)$
- 37) $-(3+4)$
- 38) $(-1)(3)^2$
- 39) $(-1 \cdot 3)^2$
- 40) -3^2
- 41) $(-3)^2$

Word Problems.

- 42) The difference between four and twice a number is 2. Find the number.
- 43) The product of two equal numbers is 9. Find the numbers.
- 44) The sum of one-half and a number is $\frac{7}{2}$. Find the number.

Ordered Lists.

- 45) Write the following lists in order from least to greatest:
 - a) $\frac{1}{2}, \frac{1}{3}, \frac{2}{3}, \frac{3}{5}, \frac{1}{9}, \frac{3}{2}, \frac{7}{4}, 1, 0$
 - b) 3.1, 3.0, 3.006, 3.008, 3.02
 - c) $3, 3^2, \frac{1}{3}, \left(\frac{1}{3}\right)^2, 2, 2^2, \frac{1}{2}, \left(\frac{1}{2}\right)^2$

Problem Set #4

Order of Operations.

Simplify.

1) Use the *Order of Operations* to simplify the following:

- $2 - (4 + 3)^2$
- $(3 + 7)^2 \cdot 9 - 3$
- $3 \cdot 3^3 - 4(1 + 2)$
- $(3 + 2)^2 \div 5$
- $(3(4+2)^2) - 3^2 + 3 \cdot 8$
- $\frac{1}{2} - \frac{2}{3} \cdot \frac{4^2}{7}$

Fill in the blank.

- If $x = 9$, then $x + 7 = \underline{\hspace{2cm}}$
- If $y = 3$, then $y - 5 = \underline{\hspace{2cm}}$
- If $a = -2$, then $5a = \underline{\hspace{2cm}}$
- If $b = 12$, then $\frac{144}{b} = \underline{\hspace{2cm}}$
- If $c = 4$, then $c^2 + 2c = \underline{\hspace{2cm}}$
- If $d = -3$, then $7 - d^3 = \underline{\hspace{2cm}}$

Formulas.

3) Use the formulas

$$C = \frac{5}{9} \cdot (F - 32)$$

$$F = \frac{9}{5} \cdot C + 32$$

Convert between Fahrenheit and Celsius

- Convert 90°F to $^\circ\text{C}$
- Convert 50°C to $^\circ\text{F}$
- Convert 0°F to $^\circ\text{C}$
- Convert -40°C to $^\circ\text{F}$

Solving Equations.

Simple *equations* can be easy to solve in our heads.

For example: The solution to $x + 7 = 9$ is $x = 2$.

Solve for the variable:

- $5x = 25$
- $10 + y = 100$
- $\frac{z}{2} = 4$
- $7a = -63$
- $5b + 3 = 33$
- $c^2 = 4$
- $z - 18 = -20$
- $18x = 0$
- $18x = 18$
- $5x + 5 = 2x + 8$

Ordered Lists.

Write the following lists in order from least to greatest:

- $\frac{5}{6}, 1, -1, \frac{-5}{6}, \frac{5}{-6}, \frac{-5}{-6}, \frac{6}{5}, \left(\frac{5}{6}\right)^2, \left(\frac{-5}{6}\right)^2, \left(\frac{6}{5}\right)^2$
- 5.01, 5.019, 5.021, 5.009, 5.0909

Word Problems.

- The sum of a number and 5 is equal to 53. Find the number.
- The product of eight and a number is 96. Find the number.
- The difference of a number and 23 is 40. Find the number.
- The sum of three consecutive (numbers next to each other) positive whole numbers is 30. Find all three numbers.
- The sum of twice a number and 9 is 15. Find the number.
- If 3 with an exponent is 27, find the exponent.

Problem Set #5

Formulas.

- 1) Use *Galileo's Law of Falling Bodies*:
 $d = 4.90t^2$ (meters), or
 $d = 16.1t^2$ (feet)
 to calculate the distance an object falls after
 being dropped (neglecting air resistance)...
- For 1 second.
 - For 5 seconds.
 - For $2\frac{3}{5}$ seconds.
 - For $7\frac{1}{4}$ seconds.
- 2) Convert between Fahrenheit and Celsius.
- 0°C to $^\circ\text{F}$
 - -40°F to $^\circ\text{C}$
 - $2\frac{7}{9}^\circ\text{C}$ to $^\circ\text{F}$
 - 16.2°F to $^\circ\text{C}$

Fill in the blank.

- 3) a) If $x = -3$, then $5x + 2 = \underline{\hspace{2cm}}$
 b) If $y = 4$, then $-5y - 2 = \underline{\hspace{2cm}}$.
 c) If $z = 1.1$, then $z^2 = \underline{\hspace{2cm}}$.
 d) If $a = \frac{1}{2}$, then $a + \frac{1}{3} = \underline{\hspace{2cm}}$.

Simplify.

- $10 \cdot 0.1$
- $(-8)(7)(-2)$
- $4 - 3 - (-4) + (-5) - (-1)$
- $3\left(\frac{1}{9}\right)$
- $\frac{1}{3} \cdot \frac{1}{9}$
- $\frac{3}{4} \cdot \frac{16}{9}$
- $(1.1)^2$
- $\left(\frac{11}{10}\right)^2$
- $\frac{1}{5} + \frac{2}{3} - \frac{11}{15} \cdot \frac{1}{2}$
- $\left(\frac{2}{3}\right)^3 - 4 \cdot 3^2$
- $-3 - (-3) + (-3) - (+3)$
- $(-3)(4) - (-1)(5)$
- $\frac{-3}{4} - \frac{3}{-4}$

17) $\left(\frac{1}{3}\right)\left(\frac{9}{3}\right)\left(\frac{12}{4}\right)\left(\frac{7}{21}\right)$

Solving Equations.

- 18) Solve for the variable:
- $x + 3 = 17$
 - $-7a = 84$
 - $5y + 3 = 8$
 - $\frac{b}{12} = 12$
 - $\frac{12}{b} = 12$
 - $\frac{1}{12}c = 12$
 - $\sqrt{z} = 13$
 - $3x + 2 = 4x - 1$

Combining Like Terms.

19) Simplify the following *expressions* by
combining like terms:

- $5x + 3y - 8x$
- $7x^2 + 3x - 8y + 12x^2 - 4x$
- $y - x + 5 - xy + yx + 4xy + 18$
- $5a^2b + 6b^2a - 7ab + 15ab^2 - 8a^2b^2$
- $x - y + 42 - 2x + 3y - 3x - 2y - 2 + x^2$

Ordered Lists.

- 20) Write the following lists in order from
 least to greatest:
- $(-2)^2, -2^2, 2^2, (-2)^3,$
 $-2^3, 2^3, (-2)^4, -2^4, 2^4$
 - $1, (-1)^2, (-1)^4, (-1)^6,$
 $(-1)^{1000}, -1^2, -1^4, (-1)^3$
 - $-1, -2, -1.5, -1.75,$
 $-1.705, -\frac{1}{2}, -1.7005, 0$

Word Problems.

- Three times a number
 is 81. Find the number.
- The sum of twice a number and 40 is 80.
 Find the number.
- One-half of the product of a number and
 two is 12. Find the number.

Problem Set #6

Combine Like Terms.

- 1) What is the difference between an *expression* and an *equation*?
- 2) Simplify the following *expressions* by *combining like terms*:
 - a) $5x + 3x - 4y + 8x$
 - b) $1 + 4x^2 + 3x^2 - 7y^2 + 8y - 4$
 - c) $5 - 3x^2 + 5x^3 - 76x^2 + 3y$
 - d) $5x^2y + 6yx^2 - 8xy$
 - e) $4xz + 3xy + 8xy^2z - 3yx^2z$
 - f) $5x^3 - 3x^2$

Solve.

- 3) $2x + x = 6$
- 4) $7x - 5 + 12x + 7 = 40$
- 5) $4x + 15 - 12x = 7$
- 6) $\frac{1}{2}x + \frac{3}{2}x + 3 = 9$
- 7) $4 = 2x + 3x - 13x$
- 8) $2x + 1 = 5x - 2$

Formulas.

- 9) Convert 82°F to $^\circ\text{C}$
- 10) Convert -4°C to $^\circ\text{F}$
- 11) How far has an object fallen after $4\frac{2}{5}$ seconds (neglecting wind resistance)? Give your answer in both meters and feet.

Fill in the blank.

- 12) a) If $b = 0.6$, then $\frac{3}{5} - b = \underline{\quad}$.
b) If $x = 4$ and $y = 1$, then $2x - 3y = \underline{\quad}$

- c) If $c = -8$, then $c^2 = \underline{\quad}$.
- d) If $d = -8$, then $-d^2 = \underline{\quad}$.
- e) If $m = -8$, then $1 - m = \underline{\quad}$.

Simplify.

- 13) $5(2(2^2)^2) - 4^2$
- 14) $3 + 2 \cdot 3^2 - 4(5 + 2^2)$
- 15) $6 - (9 - 11)^2$
- 16) $\frac{63}{80} \cdot \frac{64}{21}$
- 17) $8^2 - 3(5 - 10 \cdot 7^2)$
- 18) $(3 - 4)(5 + 6)^2$
- 19) $\frac{5}{6} + \frac{7}{8} - \frac{5}{9}$
- 20) $\frac{1}{13} \cdot \frac{7}{11}$
- 21) $-18 - 34 - 56 + 200$
- 22) $1^2 - 2^2 + 3^2 - 4^2 + 5^2$
- 23) $\frac{-3}{5} \cdot \frac{10}{6}$
- 24) $\frac{3}{-5} \cdot \frac{-10}{6}$

Word Problems.

- 25) Three times the sum of four and a number is 15. Find the number.
- 26) 16 is the product of negative eight and a number. Find the number.
- 27) The square of a number is 49. Find the number. Is this the only answer?
- 28) The difference of 5 and a number is 4. Find the number. Is this the only answer?