

Participation Activity 1 (M1,2)

Be sure to show your work for full credit!

1. List the elements of S that belong in the following sets.

$$S = \{4, \sqrt{25}, \sqrt{5}, 2.\overline{09}, -\frac{2}{3}, \pi, 1.235284, 0, -5\}$$

$$\text{Natural Numbers} = \{4, \sqrt{25}\} \quad \sqrt{25} = 5$$

$$\text{Whole Numbers} = \{4, \sqrt{25}, 0\}$$

$$\text{Integers} = \{4, \sqrt{25}, 0, -5\}$$

$$\text{Rational Numbers} = \{4, \sqrt{25}, 0, -5, -\frac{2}{3}, 1.235284, 2.\overline{09}\}$$

$$\text{Irrational Numbers} = \{\sqrt{5}, \pi\}$$

$$\text{Real Numbers} = \{\text{All of } S\}$$

2. Evaluate the following:

$$\text{a) } -2^2 = -(2 \cdot 2) = -4$$

$$\text{b) } (-2)^2 = -2 \cdot -2 = 4$$

$$\text{c) } -(3)^2 = -(3 \cdot 3) = -9$$

$$\text{d) } -(-3)^2 = -(-3 \cdot -3) = -9$$

3. Decide if the following are true or false.

$$\text{F a) } |4 - 6| = |4| - |6| \quad |4 - 6| = |-2| = 2, |4| - |6| = 4 - 6 = -2$$

$$\text{T b) } |-7| \times |5| = |-7 \times 5| \quad |-7| \cdot |5| = 7 \cdot 5 = 35, |-7 \cdot 5| = |-35| = 35$$

$$\text{F c) } |a| - |b| = |a - b|, \text{ if } b > a > 0 \quad \begin{array}{l} a > b > 0 \Rightarrow |a| - |b| = a - b \text{ But} \\ b > a \Rightarrow b > a - b \Rightarrow |a - b| = -(a - b) \end{array}$$

$$\text{T d) } |a| - |b| = |a - b|, \text{ if } a > b > 0 \quad \begin{array}{l} a > b > 0 \Rightarrow |a| - |b| = a - b \\ a > b \end{array}$$

$$\begin{array}{l} \Rightarrow a - b > 0 \\ \Rightarrow |a - b| = a - b \quad // \text{ equal } \checkmark \end{array}$$

4. Simplify the expression, show all steps: $-(3-7)^0 \div 2 + 4 \times 2^3 - |4-8|$

$$= -(-4)^0 \div 2 + 4 \cdot 8 - |-4|$$

$$= -(1) \div 2 + 32 - (4)$$

$$= -1 \div 2 + 32 - 4$$

$$= -\frac{1}{2} + 28$$

$$\boxed{\text{OR}} = -\frac{1}{2} + \frac{28 \cdot 2}{2}$$

$$= -\frac{1}{2} + \frac{56}{2} = \boxed{\frac{55}{2}}$$

5. The blood alcohol concentration (BAC) of a person who has been drinking is approximated by the following formula:

$$(\text{oz of liquid}) \times (\% \text{ alcohol}) \times (0.075) \div (\text{body weight in lb}) - (\text{hours of drinking}) \times (0.015)$$

Suppose a police officer stops a 190 lb man who, in 2 hours, has ingested four 12-oz beers, each having a 3.2% alcohol content. Write the expression that will calculate this man's BAC?

$$(4)(12) \times (3.2) \times (0.075) \div (190) - (2) \times (0.015)$$

6. Consider the following expression:

$$\left(\frac{-5x^4x^2}{y^2y^3} \right)^2$$

Decide on a method for simplifying this expression. List each step of your method out as you are simplifying the expression. Be sure to state what rules for exponents you are using. (Refer back to your notes for the rules for exponents.)

$$\begin{aligned} &= \frac{(-5x^4x^2)^2}{(y^2y^3)^2} \xrightarrow{\text{Power Rule}} \frac{-5^2(x^4)^2(x^2)^2}{(y^2)^2(y^3)^2} = \frac{25x^8x^4}{y^4y^6} \xrightarrow{\text{Power Rule}} \frac{25x^{12}}{y^{10}} \xrightarrow{\text{Product Rule}} \end{aligned}$$