Math 172–Assignment # 1 **Name:**_____

$A = \{0, 2, 4, 6, \ldots\}$

1. Let $A = \{x | x \text{ is an even whole number}\}$ and $B = \{-1, 0, 1\}$. Are the following statements true (T) or false (F)?

a) $A \cap B = \{0\}$ T

b) $\varnothing \subseteq B$ T

c) $W \cup N = N$ F

d) $A \cap W = W$ F

e) $B \subseteq I$ F

f) $A \subseteq R$ T

g) $A \cap N = \{2, 4, 6, \ldots\}$ T

h) $0 \in A$ T

2. Let $D = \{3, 5, 7\}$, $E = \{2, 4, 6, 8\}$, and $F = \{1, 2, 3, 4, 5\}$. Find the following sets, using correct set notation.

a) $D \cap \varnothing$ $\varnothing$

b) $(D \cap F) \cup E$ $\{3, 5, 2, 4, 6, 8\}$ $D \cap F = \{3, 5\}$

c) $(D \cup E) \cup F$ $\{1, 2, 3, 4, 5, 6, 7, 8\}$ $D \cup E = \{3, 5, 7, 2, 4, 6, 8\}$

d) $(D \cap E) \cup F$ $\{1, 2, 3, 4, 5\}$ or F $D \cap E = \varnothing$

e) $D \cap (E \cup F)$ $\{3, 5\}$ $E \cup F = \{2, 4, 6, 8, 1, 3, 5\}$

f) $(E \cap F) \cup \varnothing$ $\{2, 4\}$ $E \cap F = \{2, 4\}$

3. Using the same sets as in Question 2, use one of the symbols $\in, \subseteq, =, \cup$, or $\cap$ in the following blanks to make the statement correct.

a) $E \subseteq \{x | x \text{ is an even natural number}\}$

b) $3 \in F$

c) $D \subseteq (Z \cup F)$

d) $\{3, 5\} \neq (F \cup D)$

4. State whether the following are true (T) or false (F) for all real numbers.

a) $3y(x-z) = 3xy - yz$ F

b) $\sqrt{x+y} = \sqrt{x} + \sqrt{y}$ F

c) $3(a \times b) = 3a \times 3b$ F

d) $3x \div \frac{2}{5} = 3x(\frac{5}{2})$ T

e) $(-x+2y) - (-x+2y) = 0$ T

f) $y(x+y) = xy + 2y$ F

5. List all of the sets (R,Q,I, Z, N and W) that the following numbers belong to.

a) 0.34 Q, R

b) π I, R

c) 3 N, W, Z, Q, R

d) 0 W, Z, Q, R

e) $\frac{5}{3}$ Q, R

6. Given the set $A = \{-23, -1, 0, 0.\overline{57}, 1.27, \sqrt{5}, \pi, \frac{71}{5}\}$, find:

a) $A \cap I$ $\{\sqrt{5}, \pi\}$

b) $A \cap R$ $\{-23, -1, 0, 0.\overline{57}, 1.27, \sqrt{5}, \pi, \frac{71}{5}\}$ or A

c) $A \cap Z$ $\{-23, -1, 0\}$

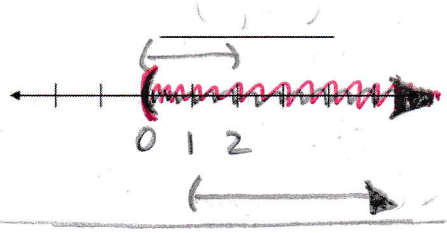
d) $A \cap Q$ $\{-23, -1, 0, 0.\overline{57}, 1.27, \frac{71}{5}\}$

e) $A \cap W$ $\{0\}$

7. Graph each union or intersection below. Write it as a single interval if possible. If it's not possible, write the original interval in the space provided. If the answer is the empty set, say so.

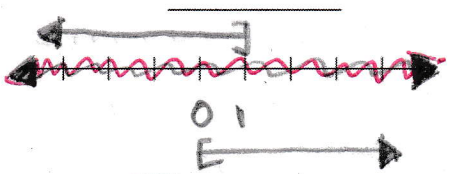
a) $(0,2) \cup (1,\infty)$

$(0,\infty)$



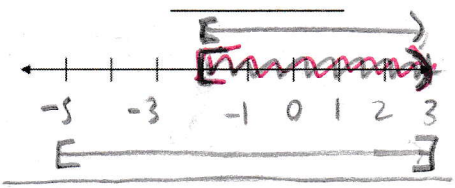
b) $(-\infty,1] \cup [0,\infty)$

$(-\infty,\infty)$



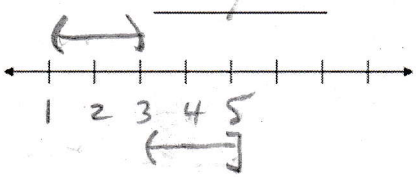
c) $[-2,3) \cap [-5,3]$

$[-2,3)$



d) $(1,3) \cap (3,5]$

$\emptyset$



e) $(1,3) \cup (3,5]$

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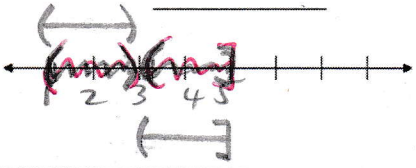
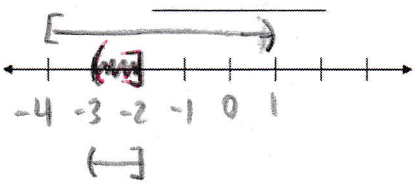


f) $[-4,1) \cap (-3,-2]$

$(-3,-2]$



8. Evaluate the following, showing your work.

a) $\frac{1}{2} - |\frac{1}{3} - \frac{2}{3}|$

$= \frac{1}{2} - |\frac{-1}{3}|$

$= \frac{1}{2} - \frac{1}{3}$

$= \frac{3}{6} - \frac{2}{6}$

$= \frac{1}{6}$

$\frac{1}{6}$

b) $-0.5(0.2) - 0.07$

$= -0.1 - 0.07$

$= -0.17$

-0.17

c) $\sqrt{5^2 + 12^2} - (2+3)^2$

$= \sqrt{25 + 144} - 5^2$

$= \sqrt{169} - 25$

$= 13 - 25$

$= -12$

-12

d) $64 \div (-4) \times (-2) \div \frac{1}{2} \times (-1)$

$= 64 \times (\frac{1}{-4}) \times (-2) \times 2 \times (-1)$

$= 64 \times (\frac{1}{2}) \times (-2)$

$= 64 \times (-1)$

$= -64$

-64

e) $-(6-2^3)^4 + (-18) \div (-0.9)$

$= -(6-8)^4 + \frac{-18}{-0.9}$

$= -(-2)^4 + \frac{18}{0.9}$

$= -16 + \frac{180}{9}$

$= -16 + 20$

$= 4$

4

f) $-3^2+[1-(-3)]^3$ 55

$= -9 + 4^3$

$= -9 + 64$

$= 55$

g) $(0.3+0.4)^2-0.3^2-0.4^2$ 0.24

$= 0.7^2 - 0.09 - 0.16$

$= 0.49 - 0.25$

$= 0.24$

h) $\frac{1}{10} \div (-\frac{2}{5}) - \frac{72}{4} \times (-\frac{1}{9})$ 7/4

$= \frac{1}{10} \times (\frac{-5}{2}) - \frac{72}{4} \times (\frac{-1}{9})$

$= \frac{-5}{20} + \frac{72}{36}$

$= -\frac{1}{4} + 2$

$= -\frac{1}{4} + \frac{8}{4}$

$= 7/4$

9. Find the value of the following expressions when $y_1 = 4, y_2 = -5$, $x_1 = -3, x_2 = 3$. Show your work.

a) $-x_2^2 - y_1^3$ -73

$= -3^2 - 4^3$

$= -9 - 64$

$= -73$

b) $\frac{y_2-y_1}{x_2-x_1}$ -3/2

$= \frac{-5-4}{3-(-3)}$

$= \frac{-9}{6} = -3/2$

c) $y_2^2 - |x_1 - y_1| + x_2 y_2$ 3

$= (-5)^2 - |-3-4| + 3(-5)$

$= 25 - |-7| - 15$

$= 25 - 7 - 15$

$= 3$

10. Simplify the following expressions, showing your work.

a) $\frac{2}{5}(45b-30)-\frac{1}{3}(45b-30)$

$3b-2$

$= \frac{2}{5}(45b) - \frac{2}{5}(30) - \frac{1}{3}(45b) - \frac{1}{3}(-30)$

$= 2(9b) - 2(6) - 15b + 10$

$= 18b - 12 - 15b + 10$

$= 3b - 2$

b) $-(3pq)^2-2p^2(q^2-2)+p(q^2p)$

$-10p^2q^2+4p^2$

$= -9p^2q^2 - 2p^2q^2 + 4p^2 + p^2q^2$

$= -10p^2q^2 + 4p^2$

c) $0.25(100-x)-0.5(20-2x)$

$15+0.75x$

$= 0.25(100) - 0.25x - 0.5(20) - 0.5(-2x)$

$= 25 - 0.25x - 10 + x$

$= 15 + 0.75x$

d) $\frac{4x-8}{-2} - \frac{4x-8}{2}$

$-4x+8$

$= -\frac{1}{2}(4x-8) - \frac{1}{2}(4x-8)$

$= -2x+4 - 2x+4$

$= -4x+8$