

## Math 172 – Quiz #1

October 4, 2013

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Total: 40 points

**Part A:** For these short-answer questions, it is not necessary to show any work. Place your final answer in the space provided. Each answer is worth one point.

[5]

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

a)  $-7$

R, Q, Z

b)  $0.7$

R, Q

c)  $-0.7$

R, Q

d)  $\sqrt{7}$

R, I

e)  $\frac{1}{7}$

R, Q

[4]

2. Given  $A = \{0\}$ ,  $B = \{2, 4, 6\}$ ,  $C = \{x \mid x \text{ is a positive integer}\}$ , find:

a)  $A \cap B$

$C = \{1, 2, 3, \dots\}$

$\emptyset$

b)  $A \cup C$

$\{0, 1, 2, 3, \dots\}$  or W

c)  $A \cup (B \cap C)$

$B \cap C = \{2, 4, 6\}$

$\{0, 2, 4, 6\}$

d)  $\emptyset \cup (C \cup N)$

$C \cup N = \{1, 2, 3, \dots\}$

$\{1, 2, 3, \dots\}$  or N or C

[5]

3. Determine whether each of the following statements is True or False:

a)  $\sqrt{2} \in \mathbb{R}$

T

b)  $W \subseteq N$

$W = \{0, 1, 2, 3, \dots\}$

F

c)  $Q \cap I = \mathbb{R}$

$Q \cap I = \emptyset$

F

d)  $\emptyset \cup W = W$

T

e)  $\{-3\} \subseteq Z$

T

[4]

4. State whether the following equations are true or false for all real numbers:

a)  $-(4-y) = y-4$

T

b)  $(a+b)^2 = a^2 + b^2$

F

c)  $x-(y-z) = (x-y)-z$

F

d)  $\frac{k+5}{k} = 5$

F

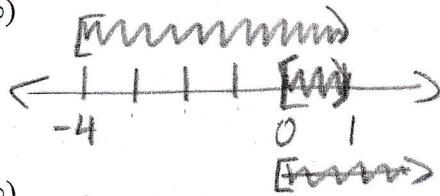
[2]

5. Write each union or intersection as a single interval, if possible. If it can't be written as a single interval, write the original interval in the space provided. If the answer is the empty set, say so.

a)  $[-4, 1) \cap [0, \infty)$

[0, 1)

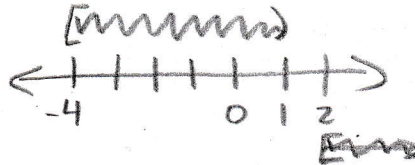
Rough work:



b)  $[-4, 1) \cap [2, \infty)$

 $\emptyset$ 

Rough work:

**Part B:** For these questions, show your work and place your final answer in the space provided. Each answer is worth 2 points.

[14]

6. Evaluate each of the following expressions. Reduce any fractions to lowest terms.

$$\begin{aligned} \text{a) } & -20 \div \left(-\frac{5}{4}\right) + 18 \div \sqrt{4} \\ & = \overset{(-4)}{-20} \times \left(\frac{-4}{5}\right) + \frac{18}{\sqrt{4}} \\ & = 16 + \frac{18}{2} \\ & = 16 + 9 \end{aligned}$$

25

$$\begin{aligned} \text{b) } & (4-1)^3 - \sqrt{10^2 - 8^2} \\ & = 3^3 - \sqrt{100 - 64} \\ & = 27 - \sqrt{36} \\ & = 27 - 6 \end{aligned}$$

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$$\begin{aligned} \text{c) } & \frac{12 - 2 \times 4}{12 - (-8)} \\ & = \frac{12 - 8}{20} \\ & = \frac{4}{20} \end{aligned}$$

 $\frac{1}{5}$ 

$$\begin{aligned} \text{d) } & 24 \div \frac{4}{3} \times (-10) \div \frac{1}{2} \div (-3) \\ & = \frac{6}{24} \times \frac{3}{4} \times (-10) \times 2 \times \left(\frac{-1}{3}\right) \\ & = 18 \times (-20) \times \left(\frac{-1}{3}\right) \\ & = 6 \times (-1) \times (-20) \rightarrow = -6 \times (-20) \end{aligned}$$

$\div \frac{a}{b}$  is the same as  $\times \frac{b}{a}$

120

$$\begin{aligned} \text{e) } & -40(0.2) - (0.8)(0.1) \\ & = -8 - 0.08 \end{aligned}$$

-8.08

$$\begin{aligned} \text{f) } & -3^2 \div \left(\frac{1}{3^2}\right) + 33 \div 1.1 \\ & = -3^2 \times 3^2 + \frac{33}{1.1} \\ & = -9 \times 9 + \frac{330}{11} \\ & = -81 + 30 \end{aligned}$$

-51

$$\text{g) } \sqrt{b^2 - 4ac}, \text{ where } b \text{ and } c \text{ are equal to } -1 \text{ and } a \text{ equals } 12$$

$$\begin{aligned} & = \sqrt{(-1)^2 - 4(12)(-1)} \\ & = \sqrt{1 + 48} \\ & = \sqrt{49} \end{aligned}$$

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[6]

7. Simplify the following algebraic expressions. You may leave your answer in decimal form.

a)  $\frac{24-36m}{-6} - \frac{48m-60}{-12}$

$$\underline{10m-9}$$

$$= \frac{-1}{6}(24-36m) - \frac{1}{-12}(48m-60)$$

$$= -4 + 6m + \frac{1}{12}(48m-60)$$

$$= -4 + 6m + 4m - 5$$

b)  $12y(1+2x) - 8x(3y-x)$

$$\underline{12y+8x^2}$$

$$= 12y + 24xy - 24xy + 8x^2$$

c)  $0.2(25p-5q) - 10(0.5q-p)$

$$\underline{15p-6q}$$

$$= 5p - q - 5q + 10p$$