Instructor: Bassam Al-Absi   Quiz #1

Name: _____   SEC_____ ID#: _____

(9 pts) 1. Fill in the following blanks?

1 **a.** The additive inverse of $-3\frac{2}{5}$ is $\frac{17}{5}$

   $= -\frac{17}{5}$

1 **b.** Every real number has a multiplicative inverse   *False*

1 **c.** $-2(xy+z)=-2yx-2z$ is true because of   *Distribution & Commutative prop.*

1 **d.** If $x > 0$, then $|-x| = -(-x)$ x

2 **e.** If x > y, then $\sqrt{(x+y)^2-4xy}$ simplifies to $= |x-y| = x-y$

   $= \sqrt{x^2+2xy+y^2-4xy} = \sqrt{x^2-2xy+y^2} = \sqrt{(x-y)^2}$

1 **f.** Using absolute value symbols the statement "*x is closer to a than it is from b*" can

   expressed as $|x-a| < |x-b|$

2 **g.** $\left(\sqrt[3]{x+2}+\sqrt[3]{x-2}\right)\left(\sqrt[3]{(x+2)^2}-\sqrt[3]{x^2-4}+\sqrt[3]{(x-2)^2}\right) =$ $2x$

   $= x+2+x-2$

(6 pts) 2. Consider the following three sets

$A = \{y : y = x^2-1, x \text{ is an integer}, 0 < x < 4\}$
$B = \{x : x \text{ is a composite number} < 10\}$
$C = \{y : y \text{ is the smallest even prime number}\}$

(1.5 + 1.5) **a.** List all elements of the set $A = \{1^2-1, 2^2-1, 3^2-1\} = \{0, 3, 8\}$

1 **b.** List all elements of the set $B = \{4, 6, 8, 9\}$

   c. List all elements of the set $C = \{2\}$

2 **d.** List all elements of the set $A \cap (B \cup C) = A \cap \{2, 4, 6, 8, 9\} = \{8\}$

(5pts) 3. If $x = -5$ and $y = 4$, then find the value of $\dfrac{x|-2y-|x|-1|}{3|x|-xy}$ without the absolute value symbols.

$$= \frac{-5\left|-2\cdot 4-|-5|-1\right|}{3|-5|-(-5)\cdot 4} = \frac{-5\left|-8-5-1\right|}{15+20} \quad (2\,pt)$$

$$(1\,pt)$$

$$= \frac{-5\cdot 14}{35} = -2$$

$$(2\,pt)$$

(6 pts) 4. Given that $x > 0, y > 0$, simplify the expression $\left[\dfrac{\left(5x^2y\right)^{-1}\left(5x^3y^{-2}\right)^2}{5(xy)^{-3}\left(x^5y^{-2}\right)^{-1}}\right]^{-\frac{1}{4}}$ to the simplest form.

$$= \left[\frac{5^{-1}x^{-2}y^{-1}\,5^2x^6y^{-4}}{5\,x^{-3}y^{-3}x^{-5}y^2}\right]^{-\frac{1}{4}} \quad (2\,pts)$$

$$= \left[5^{-1+2-1}\cdot x^{-2+6-(-3)-(-5)}\cdot y^{-1+(-4)-(-3)-2}\right]^{-\frac{1}{4}}$$

$$= \left[5^0\; x^{12}\; y^{-4}\right]^{-\frac{1}{4}} = \frac{4\sqrt{y^4}}{4\sqrt{(x^3)^4}} = \frac{|y|}{|x^3\cdot|} = \frac{y}{x^3}$$

$$(3\,pts)$$

$$(1\,pt)$$

(4 pts) 5. Simplify $-\dfrac{1}{\sqrt[3]{5}}+\dfrac{3}{\sqrt[3]{40}}-\dfrac{3}{\sqrt[3]{135}}$. Give your answer with a rationalized the denominator.

$$\frac{-1}{\sqrt[3]{5}}+\frac{3}{2\sqrt[3]{5}}-\frac{3}{3\sqrt[3]{5}} = \frac{-6+9-6}{6\sqrt[3]{5}} = \frac{-3}{6\sqrt[3]{5}} \quad (1\,pt)$$

$$(1\,pt) \qquad (1\,pt)$$

$$= \frac{-1}{2\sqrt[3]{5}}\cdot\frac{\sqrt[3]{5^2}}{\sqrt[3]{5^2}} = \frac{-\sqrt[3]{25}}{10} \quad (1\,pt)$$