

**King Fahd University of Petroleum and Minerals**  
**College of Sciences Math Prep-Year Program**  
**Math 003-Term 041 A**

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Name: \_\_\_\_\_ SEC \_\_\_\_\_ ID#: \_\_\_\_\_

**QUESTION 1** TRUE AND FALSE QUESTIONS:

1. The product of two prime numbers is a prime number \_\_\_ F \_\_\_\_\_
2. Irrational numbers are closed under addition \_\_\_ F \_\_\_\_\_
3.  $\sqrt[3]{a^3 - b^3} = a - b$  \_\_\_ F \_\_\_\_\_
4.  $\sqrt[6]{a^{12}b^6} = a^2|b|$  \_\_\_ T \_\_\_\_\_
5. Irrational numbers  $\cap$  Rational numbers = Real numbers \_\_\_ F \_\_\_\_\_
6.  $\{0,1,-1\}$  is closed under addition \_\_\_ F \_\_\_\_\_
7.  $|-x| = x$ , for any real number  $x$  \_\_\_ F \_\_\_\_\_
8. If  $x < 0$ , then  $|-x| = -x$  \_\_\_ T \_\_\_\_\_
9.  $-4\frac{2}{5}$  is the reciprocal of  $\frac{5}{22}$  \_\_\_ F \_\_\_\_\_

**QUESTION 2.** If

$$A = \{y : y = x^2 - 1, x \text{ is an integer, } -2 < x < 3\} = \{0, -1, 3\}$$

$$B = \{x : x \text{ is a composite number } < 12\} = \{4, 6, 8, 9, 10\}$$

$$C = \{y : y \text{ is the smallest even prime number}\} = \{2\}$$

$$\text{Find } A \cap (B \cup C) = \{0, -1, 3\} \cap \{2, 4, 6, 8, 9\} = \phi$$

**QUESTION 3.** Write the following without absolute value notation:  $\left| \left| x - \frac{1}{4} \right| - \left| x - \frac{1}{2} \right| \right|$ ;  $0 < x < \frac{1}{5}$

$$\left| -\left(x - \frac{1}{4}\right) - \left(-\left(x - \frac{1}{2}\right)\right) \right| = \left| -x + \frac{1}{4} + x - \frac{1}{2} \right| = \left| -\frac{1}{4} \right| = \frac{1}{4}$$

**QUESTION 4** Simplify:  $\left( \frac{(x-y)^2(2z^4)}{[z(x-y)]^3} \right)^2$

$$\left( \frac{(x-y)^2(2z^4)}{[z(x-y)]^3} \right)^2 = \frac{(x-y)^4(2^2z^8)}{z^6(x-y)^6} = \frac{4z^{8-6}}{(x-y)^{6-4}} = \frac{4z^2}{(x-y)^2}$$

**QUESTION 5:** Simplify:  $\frac{2}{\sqrt[3]{54}} - \frac{1}{\sqrt[3]{2}}$

$$\frac{2}{\sqrt[3]{54}} - \frac{1}{\sqrt[3]{2}} = \frac{2}{3\sqrt[3]{2}} - \frac{1}{\sqrt[3]{2}} = \frac{2-3}{3\sqrt[3]{2}} = -\frac{1}{3\sqrt[3]{2}} \frac{\sqrt[3]{4}}{\sqrt[3]{4}} = \frac{-\sqrt[3]{4}}{6}$$