QUIZ – Basic Algebra

1. For any two nonzero values $a$ and $b$, the expression $\frac{1}{a} + \frac{1}{b} = ?$
   (a) $\frac{2}{a+b}$
   (b) $\frac{1}{ab}$
   (c) $\frac{ab}{a+b}$
   (d) $\frac{a+b}{ab}$
   (e) None of the above

2. For any real value $x$, the expression $\sqrt{x^2} = ?$
   (a) $x$
   (b) $-x$
   (c) $\pm x$
   (d) $|x|$
   (e) None of the above

3. For any two real values $x$ and $y$, the expression $\sqrt{x^2 + y^2} = ?$
   (a) $x+y$
   (b) $\pm(x+y)$
   (c) $|x+y|$
   (d) $|x|+|y|$
   (e) None of the above

4. Solve for $p$: $|p - 2| \leq 7$
   (a) 9
   (b) $-5$ and 9 are both solutions
   (c) $[-5,9]$
   (d) $(-\infty,-5] \cup [9,\infty)$
   (e) None of the above

5. Solve for $p$: $|p - 2| \leq -7$
   (a) 9
   (b) $-5$ and 9 are both solutions
   (c) $[-5,9]$
   (d) $(-\infty,-5] \cup [9,\infty)$
   (e) None of the above
6. Solve for $z$:  $e^z = e^x + e^y$
   (a) $z = x + y$
   (b) $z = \ln(e^x + e^y)$
   (c) $z = \ln(x + y)$
   (d) $z = \ln(x) + \ln(y)$
   (e) None of the above

7. For any real value $x$, the expression $3\sqrt{-x^3} =$ ?
   (a) $-x$
   (b) $-|x|$
   (c) $|x|$
   (d) Does not exist
   (e) None of the above

8. Which of the following statements about logarithms is (are) TRUE?
   (a) $\log_b a = -\log_a b$
   (b) $\ln(x^r) = r \ln(x)$ for any value of $r$ and nonnegative value $x$.
   (c) $\ln(x^r) = \ln(x)^r$ for any value of $r$ and nonnegative value $x$.
   (d) Both (b) and (c)
   (e) None of the above

9. Which of the following statements is (are) TRUE about $f(x) = \frac{3x + 8}{x^2 - 4}$?
   (a) The graph of $f(x)$ passes through the origin.
   (b) $f(x)$ has vertical asymptotes at $x = \pm 2$.
   (c) The $X$-axis is a horizontal asymptote for $f(x)$.
   (d) Both (b) and (c)
   (e) None of the above

10. Which of the following statements is (are) TRUE about $g(x) = \frac{3x + 8}{x^2 + 4}$?
    (a) The graph of $g(x)$ passes through the origin.
    (b) $g(x)$ has vertical asymptotes at $x = \pm 2$.
    (c) The $X$-axis is a horizontal asymptote for $g(x)$.
    (d) Both (b) and (c)
    (e) None of the above