

ALGEBRA I INDIVIDUAL TEST – WANDO MATH TOURNAMENT 2009

Note – NOTA (choice E) means none of the answers are correct

1) What is the distance between the points  $(-4, -2)$  and  $(5, -5)$ ?

- A)  $5\sqrt{11}$       B) 9.5      C)  $3\sqrt{10}$       D)  $9\sqrt{10}$       E) NOTA

2) Which of the following are true:

- I. All rational numbers are natural  
 II. All integers are rational  
 III. All whole numbers are irrational

- A) I only      B) II only      C) III only      D) I and II      E) I, II, and III

3) Expand:  $(x-4)(x+2)(x-3)(x+4)$

- A)  $x^4 + 6x^3 - 22x^2 + 20x - 64$       B)  $x^4 - x^3 + 18x^2 + 16x - 64$   
 C)  $-x^4 + 10x^3 - 12x^2 + 30x - 86$       D)  $x^4 - x^3 - 22x^2 + 16x + 96$       E) NOTA

4) Find all real values of x if  $3x - \frac{8}{x} = 10$

- A)  $x = \frac{5 \pm \sqrt{31}}{3}$       B)  $x = 1, \frac{-4}{3}$       C)  $x = 4, \frac{-2}{3}$       D)  $x = \frac{-5 \pm \sqrt{33}}{3}$       E) NOTA

5) If five less than four times a number is less than three, then the number **must** be

- A) positive      B) negative      C) more than 2      D) less than 2      E) NOTA

6) Simplify:  $\frac{(x^3)^2 y^7 (x^2 y^3)^4 xy^2}{(xy^2)^6 (xy)^3 x^2 y^4}$

- A)  $x^6 y^2$       B)  $x^5 y^3$       C)  $x^6 y^4$       D)  $x^4 y^2$       E) NOTA

7) Solve for x:  $4 - 6x \leq 8$

- A)  $x \leq \frac{-2}{3}$       B)  $x \geq \frac{-2}{3}$       C)  $x \leq \frac{2}{3}$       D)  $x \geq \frac{2}{3}$       E) NOTA

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8) The hypotenuse of a right triangle is 2 inches longer than the length of one of its legs. In terms of the length,  $l$ , of this leg, what is the length of the remaining leg?

- A)  $4l + 4$       B)  $4l - 4$       C)  $(4l + 4)^2$       D)  $\sqrt{4l + 4}$       E) NOTA

9) Suppose you are again given the triangle described in #8, but are now told that  $l = 3$ . Which of the following is true?

- A) The perimeter is 8      B) The triangle is similar to a 30-60-90 triangle  
 C) The sides form a Pythagorean triple      D) A, B, and C are all true      E) NOTA

10) Which of the following answers would be valid for the inequality  $|x| > 5$ ?

- A) 0      B)  $-2\pi$       C) 4      D) -5      E) NOTA

11) What is the y-intercept of the line that passes through (8,33) and  $(-2,-7)$

- A) -1      B) 0      C) 1      D) 2      E) NOTA

12) Simplify:  $(x^2 - 2x + 1)^2 + (-x^4 + 5x^3 + 3x^2 + 5)$

- A)  $x^3 - 5x^2 + 3x - 2$       B)  $x^3 + 9x^2 - 4x + 6$   
 C)  $x^3 - 7x^2 + 3x - 1$       D)  $-x^3 + 5x^2 - 4x - 2$       E) NOTA

13) Suppose  $\sqrt{x-5} = 6$ . What can you conclude about  $x$ ?

- A)  $x < 41$       B)  $x > 41$       C)  $x > 31$       D)  $x < 31$       E) NOTA

14) If  $g$  is a function such that  $g(a) = 17$ ,  $g(b) = 17$ , and  $g(c) = 4$ , then which of the following are true?

- I.  $a = b$       II.  $a \neq b$       III.  $b = c$       IV.  $b \neq c$

- A) I only      B) IV only      C) I and IV      D) II and IV      E) NOTA

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15) The graph of  $y = \frac{3}{2}x - 2$

- A) Crosses the y-axis at 2      B) Never touches the x-axis      C) Increases at  $\frac{3}{2}$  the rate of  $y = \frac{2}{3}x - 2$   
 D) Increases 2 units in the x direction for every 3 units in the y direction      E) NOTA

16) Bob is working on a science project involving the change in temperature of a certain gas over time. He discovers that after  $m$  minutes have elapsed, the temperature,  $t$ , of the gas measured in Celsius is  $m(m-11)$ . After how many minutes will the gas first reach a temperature of 60 ?

- A) 4      B) 15      C) 10      D) Never      E) NOTA

17) If  $\sqrt{x} = \frac{1}{5}$  then find the value of  $\frac{\frac{x}{x}}{\frac{x}{5}}$

- A)  $25^0$       B)  $25^1$       C)  $25^2$       D)  $25^3$       E) NOTA

18) If  $16x^3 - 25x = 0$ , then find the sum of the solutions:

- A)  $\frac{5}{2}$       B)  $\frac{25}{8}$       C) 2      D) -1      E) NOTA

19) If  $(x+y)^2 = 100$  and  $(x-y)^2 = 80$ , then what is  $x^2 + xy + y^2$  ?

- A) 80      B) 90      C) 95      D) 110      E) NOTA

20) When the repeating decimal  $0.\overline{423}$  is written in simplest form, what is the sum of the numerator and the denominator?

- A) 150      B) 158      C) 1422      D) 1423      E) NOTA

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21) If the area of a square is represented by  $4x^2 + 20x + 25$ , then what is the perimeter?

- A)  $3x - 10$       B)  $12x + 16$       C)  $16x - 24$       D)  $8x + 20$       E) NOTA

22) Mark was asked by his teacher to add 5 to a number and then divide the result by 2. Instead, he added 2 and then divided the result by 5, giving an answer of 9. What would his answer have been if he had worked the problem correctly?

- A) 9      B) 24      C) 43      D) 7.8      E) NOTA

23) Find the units digit of  $2^{2009}$

- A) 2      B) 4      C) 6      D) 8      E) NOTA

24) Two-thirds of a pile of coins are nickels, one fourth are dimes, and the rest are quarters. If the total value of the coins is \$4.75, how many nickels are there?

- A) 40      B) 30      C) 39      D) 42      E) NOTA

25) If  $f(1) = 3$ ,  $f(2) = 5$ ,  $f(3) = 4$ ,  $f(4) = 2$ , and  $f(5) = 1$ , then what is  $f(f(f(f(4))))$ ?

- A) 1      B) 2      C) 3      D) 4      E) NOTA