

**February Statewide
Seminole High School
Algebra 2 Individual**

NOTA means “none of the answers is correct” and $i = \sqrt{-1}$.

1. Suppose a and b vary inversely. Determine a when $b = -12$, if $a = 4$ when $b = 6$.

- a. -3 b. -2 c. 2 d. 3 e. NOTA

2. $\begin{vmatrix} 5 & 6 \\ 7 & 8 \end{vmatrix} =$ a. -2 b. -82 c. 2 d. 82 e. NOTA

3. Determine the slope of the line $x = \frac{4}{7}$. a. $\frac{4}{7}$ b. $-\frac{4}{7}$ c. $\frac{7}{4}$
d. 0 e. NOTA

4. Determine the total number of x-intercepts and y-intercepts of $\frac{(x-3)^2}{25} + \frac{(y+2)^2}{9} = 1$.

- a. 1 b. 2 c. 3 d. 4 e. NOTA

5. A committee of 3 men and 2 women are selected from a pool of 6 men and 7 women. How many committees can be formed?

- a. 41 b. 420 c. 2080 d. 5040 e. NOTA

6. The 5th term of an arithmetic sequence is 10. The 13th term is -19. Determine the 2nd term.

- a. $\frac{49}{2}$ b. $\frac{167}{8}$ c. $-\frac{49}{2}$ d. $-\frac{167}{8}$ e. NOTA

7. If $f(x) = \frac{1}{x+1}$, evaluate $f(f(f(f(2))))$.

- a. $\frac{4}{7}$ b. $\frac{7}{11}$ c. $\frac{7}{4}$ d. $\frac{11}{7}$ e. NOTA

8. Determine the total number of vertical and horizontal asymptotes: $y = \frac{3x+5}{7-|x|}$

- a. 0 b. 2 c. 4 d. 6 e. NOTA

9. Determine the value that y approaches as x approaches infinity: $y = \frac{250}{1 + 3e^{-0.05x}}$.

- a. -250 b. 0 c. 67.5 d. 250 e. NOTA

10. Determine the slope of the tangent line at the point $(-2, 1)$ for the following circle.

$$(x-1)^2 + (y+3)^2 = 25$$

- a. $-\frac{4}{3}$ b. $-\frac{3}{4}$ c. $\frac{3}{4}$ d. $\frac{4}{3}$ e. NOTA

11. Determine the number of solutions to the following system.

$$f(x) = x^4 \text{ and } g(x) = 4^x$$

- a. 0 b. 1 c. 2 d. 3 e. NOTA

12. Solve for x : $5|x-7| \leq 15$.

- a. $[-4, 10]$ b. $[-3, 17]$ c. $[3, 17]$ d. $[4, 10]$ e. NOTA

13. An open-top rectangular box has volume 50 cubic centimeters. The length is twice the width.

Determine the surface area, S , (square centimeters) as a function of the width, x , (centimeters).

- a. $S(x) = 4x^2 + \frac{150}{x}$ b. $S(x) = 4x^2 + \frac{100}{x}$ c. $S(x) = 2x^2 + \frac{150}{x}$ d. $S(x) = 2x^2 + \frac{100}{x}$ e. NOTA

14. Determine the y -intercept: $y = 2(x-3)^2 - 7$.

- a. $(-3, -7)$ b. $(0, -7)$ c. $(0, 25)$ d. $(3, -7)$ e. NOTA

15. A right triangle has area 120 cm^2 and perimeter 60cm. Find the sum of the lengths of the legs.

- a. 25 b. 34 c. 46 d. 50 e. NOTA

16. Determine the sum of the positive rational roots: $10x^5 + 6x^4 - 49x^3 + 33x^2 - 96x + 36 = 0$.

- a. $-\frac{3}{5}$ b. $\frac{3}{5}$ c. $\frac{12}{5}$ d. $\frac{48}{5}$ e. NOTA

17. Determine the intersection between the domain values and the range values of $y = -\sqrt{x+5} - 6$.

- a. $[-5, \infty)$ b. $(-6, \infty]$ c. $[-6, -5]$ d. $(-\infty, -6] \cup [-5, \infty)$ e. NOTA

18. If $z = a + bi$, then $z \cdot \bar{z} =$

- a. $a^2 + b^2$ b. $a^2 + 2ab + b^2$ c. $a^2 - 2ab + b^2$ d. $a^2 - b^2$ e. NOTA

19. Determine the probability of answering exactly 20 questions correctly by randomly guessing on every question on this test.

- a. ${}_{30}C_{20} \left(\frac{1}{4}\right)^{20} \left(\frac{3}{4}\right)^{10}$ b. ${}_{20}C_{30} \left(\frac{1}{5}\right)^{20} \left(\frac{4}{5}\right)^{10}$ c. ${}_{20}C_{10} \left(\frac{1}{5}\right)^{20} \left(\frac{4}{5}\right)^{10}$ d. ${}_{30}C_{20} \left(\frac{1}{5}\right)^{20} \left(\frac{4}{5}\right)^{10}$ e. NOTA

20. For two by two matrices, when does the commutative property of multiplication hold?

- a. always b. sometimes c. never d. cannot be determined e. NOTA

21. If $f(x) = 3x + 7$, then $f^{-1}(x) =$

- a. $-3x - 7$ b. $\frac{x-7}{3}$ c. $\frac{x}{3} - 7$ d. $\frac{x}{3} + 7$ e. NOTA

22. Determine the y-intercept of $y = 4x^5 + 9x^4 - 2x^2 - 3x$.

- a. (0,0) b. (0,-3) c. (-3,0) d. (0,3) e. NOTA

23. Dogs cost \$15 each, cats \$1 each, and mice \$0.25 each. You must purchase exactly 100 animals (at least one of each) and spend exactly \$100. Determine the ones (units) digit of the number of cats.

- a. 1 b. 3 c. 5 d. 7 e. NOTA

24. Which of the following are even functions?

- I. $y = x^2$ II. $x^2 + y^2 = 16$ III. $y = \frac{|x|+4}{3}$ IV. $y = \frac{x^3 + x}{x^4 - x^2}$

- a. all four b. only I, II, III c. only I, II d. only I, III e. NOTA

25. Determine the sum of the x- and y-coordinates of the vertex. $y = (x-4)(x+2)$

- a. -9 b. -8 c. -5 d. 6 e. NOTA

26. Determine the sum of the solutions: $\sqrt{3-x} + \sqrt{x+2} = 3$

- a. 2 b. 1 c. 0 d. -1 e. NOTA

27. Determine the focal radius: $\frac{(x-h)^2}{A} + \frac{(y-k)^2}{B} = 1$

- a. $\sqrt{A^2 - B^2}$ b. $\sqrt{A^2 + B^2}$ c. $\sqrt{A - B}$ d. cannot be determined e. NOTA

28. A farmer has chickens and goats, each with the usual number of heads and legs. If there are 44 heads and 156 legs, then determine the number of goats.

- a. 14 b. 24 c. 34 d. 44 e. NOTA

29. $\sum_{n=1}^{\infty} 5 \left(\frac{1}{2} \right)^{n-1} =$

- a. 20 b. 10 c. 5 d. no sum e. NOTA

30. Determine the ones (units) digit of the solution of: $\log_6(\log_2 x) = 1$.

- a. 2 b. 4 c. 6 d. 8 e. NOTA