

ALGEBRA ONE INDIVIDUAL TEST
2000
JANUARY REGIONAL COMPETITION

Choose the correct answer and bubble that letter on your scantron answer sheet.
If none of the answers (NOTA) are correct, then choose letter E. NOTA

1. What number is $\frac{3}{8}$ of the way from -7 to 4 ?

- A. $-2\frac{7}{8}$ B. $-\frac{1}{8}$ C. $\frac{1}{8}$ D. $1\frac{1}{4}$ E. NOTA

2. If $f(x) = \frac{3x^2 - 4x + 3}{x}$ find $f(0.6)$

- A. -10.87 B. 2.8 C. 3.68 D. 10.8 E. NOTA

3. If $xy = 24$, $yz = 48$, and $xz = 72$, and x , y , and z all > 0 , then find xyz .

- A. 96 B. 144 C. 192 D. 288 E. NOTA

4. If n is an integer from -20 to 20 , inclusive, for how many values of n will $\frac{n+3}{n} + \frac{12}{n}$ be an integer?

- A. 4 B. 6 C. 8 D. 12 E. NOTA

5. Choose the correct property: $6+(7 \times 3) = (7 \times 3) + 6$

- A. Associative of + B. Identity of +
C. Commutative of + D. Distributive E. NOTA

6. Simplify $-5^2 - (-3)^3 + (-1)^4$

- A. -57 B. -53 C. -1 D. 3 E. NOTA

7. Find the equation with the same solution as $10(2x-1)+2 = 5(3x+2)+2x$

- A. $5x-2=7x+6$ B. $3(x+4)+5=35$ C. $2x+3=x+7$ D. $3(2x-4)+8=6(2x+8)-8$ E. NOTA

8. Solve $\frac{1}{3}[6-3(x-4)] + \frac{1}{6}[(3-x)-(6-4x)] = 1$

- A. -9 B. -3 C. 3 D. 9 E. NOTA

9. In 1999 George was 4 times as old as his son. In 1990 the sum of their ages was 42. How old will the son be in 2010?

- A. 12 B. 23 C. 48 D. 59 E. NOTA

10. The length of a rectangle is 8 meters more than twice its width. If the width is doubled and the length cut in half the perimeter would be 104 meters. Find the area of the original rectangle.

- A. 192 m^2 B. 384 m^2 C. 640 m^2 D. 1280 m^2 E. NOTA

11. Solve for c : $a(b+c) + b(a+c) = d$

- A. $\frac{d - a(b+c)}{ab}$ B. $\frac{d}{a+b} - 2$ C. $\frac{d}{a+b} + \frac{2ab}{a+b}$ D. $\frac{d - 2ab}{a+b}$ E. NOTA

12. If $\frac{3}{x} = 4$, $\frac{2}{y} = 3$, and $\frac{5}{z} = 1$ find $\frac{8x+6y}{2z}$

- A. 1 B. 10 C. 25 D. 49 E. NOTA

13. Let $a * b = \frac{1}{2}(a + b - |a - b|)$. Find $(2 * 3) * 4$

- A. -3 B. 1 C. 2 D. 3 E. NOTA

14. Solve for X. $3X - 7 + 5 + 4X < 12(3X + 4) + 8$

- A. $X > 2$ B. $X < 2$ C. $X < -2$ D. $X > -2$ E. NOTA

15. Find the sum of the integral solutions of $-8 \leq \frac{1}{2}N - 4 \leq -1$
- A. -15 B. -8 C. -21 D. 21 E. NOTA
16. Find the absolute value of the difference of the solutions of $2|3N - 4| - 5 = 9$
- A. $4\frac{2}{3}$ B. $3\frac{2}{3}$ C. $2\frac{2}{3}$ D. $-4\frac{2}{3}$ E. NOTA
17. At 7:00 a.m. one morning a pilot takes off in his Cessna, for a 700 mile trip, flying at a rate of 145 mph. Three hours later his mother notices that he forgot his lunch, and takes off after him in her F-16 fighter jet. If the F-16 can go 450 mph, at what time will mom catch up to him? Round answer to the nearest minute.
- A. 11:26 am B. 11:33 am C. 11:43 am D. He gets there before she catches him E. NOTA
18. Jeff drives at 75 km/hr for 3 hours. How fast will he have to drive for the next 2 hours in order to average 100 km/hr for the entire trip?
- A. 137.5 km/hr B. 125 km/hr C. 150 km/hr
D. It is impossible for him to attain that average. E. NOTA
19. Which quadrant does not contain part of the line $3X=4Y-5$?
- A. I B. II C. III D. IV E. It's in all four
20. A line has a slope of $-\frac{2}{5}$. It contains the points (7,2) and (X,-12). Find X.
- A. 42 B. 28 C. 11 D. -28 E. NOTA
21. If $A=(5,5)$, $B=(7,3)$, $C=(-7,2)$, and $D=(-5,0)$, find the equation of the line containing the midpoints of \overline{AB} and \overline{CD} .
- A. $Y = \frac{1}{4}X + 2$ B. $Y = 4X - 10$ C. $X - 4Y = -10$ D. $X + 4Y = 2$ E. NOTA
22. If $f(X) = X^2 - 4$ and $g(X) = X^2 - X - 1$, find $f(g(f(3)))$.
- A. 437 B. 357 C. 341 D. 19 E. NOTA

23. Find Y given $2X+3Y=4$ and $5X-6Y=7$
- A. 2 B. $\frac{34}{27}$ C. $\frac{6}{7}$ D. $\frac{2}{9}$ E. NOTA
24. Given that $X = 0$ in the system
- $$\begin{aligned} 4X+Y+3Z &= 2 \\ 5X-Y-2Z &= -3 \\ 3X+2Y+5Z &= 5 \end{aligned}$$
- find $Y + Z$
- A. 7 B. 6 C. 4 D. -6 E. NOTA
25. If $(X^2 - 2X + 1)(X^2 + 3X - 2) = AX^4 + BX^3 + CX^2 + DX + E$,
find $A + B + C + D + E$.
- A. -2 B. 0 C. 2 D. 18 E. NOTA
26. Given that $2X-1$ is a factor of $2X^3 + 9X^2 + 7X - 6$, find another binomial factor.
- A. $X-2$ B. $X-1$ C. $X+1$ D. $X+2$ E. NOTA
27. Simplify $\frac{(3XY^2)^3(2X^2Y^3)^{-2}}{6X^2(Y^2)^{-2}}$
- A. $54X$ B. $\frac{27Y^4}{X^3}$ C. $\frac{9Y^4}{8X^3}$ D. $\frac{3X}{8Y^8}$ E. NOTA
28. Jack can complete a job in 8 hours. Jill can complete the same job in 6 hours. After working together for 2 hours, Jack quits. How much longer will it take Jill to finish the job alone?
- A. 4 hrs B. 3.5 hrs C. 2.5 hrs D. 2 hrs E. NOTA
29. Which of the following is/are equation(s) for which $3 + \sqrt{2}$ and $3 - \sqrt{2}$ are solutions.
I $X^2 - 6X = 7$ II $|X - 3| = \sqrt{2}$ III $X^2 = 19.49$ IV $(X+3)^2 = 2$
- A. I only B. II only C. III and IV D. I, II, III, and IV E. I and II
30. If $X = -1$ is a solution to $X^4 - 3X^3 - 4X^2 + 2X + K = 0$, then $K = ?$
- A. -5 B. 0 C. 2 D. 3 E. NOTA