

ALGEBRA ONE
JANUARY

INDIVIDUAL ROUND
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

- THESE TWO EQUATIONS ARE EQUIVALENT: $5X - 9 = 9$ AND $5X = 18$.
WHAT WAS DONE TO THE FIRST EQUATION TO GET THE SECOND EQUATION?
A. BOTH SIDES DIVIDED BY 9 B. RIGHT SIDE MULTIPLIED BY 2
C. 9 ADDED TO THE LEFT SIDE D. 9 ADDED TO BOTH SIDES E. NOTA
- SOLVE $8X - 2 = 8X - 1$ GIVEN THAT THE DOMAIN OF X IS $\{0, 1, 2, 3\}$.
A. NO SOLUTION B. $\{0\}$ C. $\{1, 2\}$ D. $\{0, 1, 2, 3\}$ E. NOTA
- FACTOR COMPLETELY: $8X + 48Y + 16Z$
A. $4(2X + 12Y + 4Z)$ B. $8(X + 48Y + 16Z)$ C. $8(X + 3Z)(X + Y)$
D. $8(X + 6Y + 8Z)$ E. NOTA
- SOLVE FOR X : $1.7X + 8 - 1.62X = 0.4X - 0.32 + 8$
A. -1.5 B. -1 C. 1 D. 1.5 E. NOTA
- SOLVE FOR K : $P = 2L + 2W + 2K$
A. $K = \frac{P - 2L - 2W}{2}$ B. $K = \frac{P}{2} - 2L + 2W$ C. $K = \frac{P}{2} - L + W$
D. $K = \frac{P + 2L + 2W}{2}$ E. NOTA
- A PERIMETER OF A RECTANGLE IS 348m. THE LENGTH IS 12 GREATER THAN THE WIDTH. FIND THE LENGTH AND THE WIDTH OF THE RECTANGLE. STATE THE SUM OF THE LENGTH AND THE WIDTH.
A. 168 B. 174 C. 212 D. 268 E. NOTA
- WHICH OF THE FOLLOWING IS AN EXAMPLE THE ASSOCIATIVE PROPERTY?
A. $X + Y = Y + X$ B. $X(Y + Z) = (Y + Z)X$
C. $X(Y + Z) = (Y + Z)X$ D. IF $X = 3Y$ THEN $3Y = X$ E. NOTA
- WRITE IN SCIENTIFIC NOTATION: 0.000023
A. 23×10^7 B. 2.3×10^6 C. 2.3×10^{-5} D. 2.3×10^{-6} E. NOTA

9. SIMPLIFY: $(7X^3 - 2X^2Y^4 + 9X) - (8X^4 - 2X^3 - 3X^2Y^4)$
- A. $-8X^4 + 9X^3 + X^2Y^4 + 9X$ B. $-8X^4 + 7X^3 - 6X^2Y^4$
 C. $-8X^4 + 9X^3 - 6X^2Y^4 + 9X$ D. $7X^3 - X^2Y^4 + 9X$ E. NOTA

10. MULTIPLY $(3X^2 + 2X - 1)(X^2 - 3)$
- A. $3X^4 + 2X^3 - 10X^2 - 6X + 3$ B. $3X^4 + 3X^3 - 10X^2 - 6X + 3$
 C. $3X^4 + 5X^3 - 3X^2 - 6X + 3$ D. $3X^4 - 10X^2 - 6X + 3$ E. NOTA

11. MULTIPLY $(5X + Y)^2$
- A. $25X^2 + Y^2$ B. $10X^2 + Y^2$ C. $5X^2 + 10XY + Y^2$
 D. $25X^2 + 10XY + Y^2$ E. NOTA

12. FACTOR $3X^2 - 5X + 2$ INTO THE FORM $(AX + B)(CX + D)$. STATE THE SUM OF $A + B + C + D$.
- A. 0 B. 1 C. 3 D. 5 E. NOTA


13. FIND THE SLOPE AND Y-INTERCEPT OF $5X = 2Y + 5$. STATE THEIR SUM.
- A. -3 B. 0 C. $\frac{3}{7}$ D. $\frac{7}{3}$ E. NOTA

14. GIVEN THE TABLE:

X	0	1	2	3	4	5	6	7	8	9
Y	0	41	89	144	206	275				

- WHAT IS THE VALUE OF Y WHEN X = 9?
- A. 391 B. 444 C. 621 D. 684 E. NOTA

15. SOLVE THIS INEQUALITY: $-7W \leq 14$.
- A. $W \leq -2$ B. $W \leq 21$ C. $W \geq -2$ D. $W \geq -7$ E. NOTA

16.  IS THE GRAPH OF WHICH INEQUALITY?
- A. $-2 > X$ B. $-X > 2$ C. $-2X > 4$ D. $-3X < 6$ E. NOTA

17. SOLVE $|M + 2| + 4 = 3$

- A. NO SOLUTION B. -3 C. -3, -1 D. -1 E. NOTA

18. IN THE 1994 WINTER OLYMPICS 67 COUNTRIES PARTICIPATED. THE TABLE SHOWS HOW MANY COUNTRIES WON EACH POSSIBLE MEDAL. HOW MANY COUNTRIES DID NOT WIN ANY MEDALS?

14	GOLD
12	GOLD & SILVER
11	GOLD & BRONZE
17	SILVER
14	BRONZE & SILVER
18	BRONZE
10	GOLD & SILVER & BRONZE

- A. 22 B. 30 C. 45 D. 52 E. NOTA

19. LET $A = \begin{bmatrix} -6 & -1 & 7 \\ 3 & -2 & -5 \end{bmatrix}$ LET $B = \begin{bmatrix} -8 & 6 & -2 \\ 14 & -3 & 1 \end{bmatrix}$
 LET MATRIX $C = 2A + B$ LET MATRIX $D = A - 2B$
 WHAT IS $C + D$?

- A. $\begin{bmatrix} -10 & 3 & 19 \\ 23 & -9 & -14 \end{bmatrix}$ B. $\begin{bmatrix} -10 & -9 & 23 \\ -5 & -3 & -16 \end{bmatrix}$ C. $\begin{bmatrix} -26 & 3 & 19 \\ 23 & -9 & -14 \end{bmatrix}$ D. $\begin{bmatrix} -26 & -9 & -14 \\ -5 & -3 & -16 \end{bmatrix}$
 E. NOTA

20. SIMPLIFY $\frac{3^2 + 3^2 + 3^2 + 3^2 + 3^2 + 3^2 + 3^2 + 3^2}{4^2 + 4^2 + 4^2 + 4^2 + 4^2 + 4^2 + 4^2 + 4^2}$

- A. $\frac{3}{4}$ B. $\frac{9}{16}$ C. $\frac{27}{64}$ D. $\frac{81}{144}$ E. NOTA

21. HOW MANY OF THE FOLLOWING ARE POLYNOMIAL EXPRESSIONS?

$$X^3Y - 2XZ - \frac{YZ}{4} \quad X\sqrt{Y} - 3X + \frac{1}{4}Y^2 \quad XY^2 - \frac{3X}{Z} + 4Y^2Z^3 \quad X^{\frac{1}{2}} - 3XY^2 + Y^{-4}$$

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

22. LET $f(X) = 3X^2 - 2X + 1$ $g(X) = \sqrt{X^2 - 3}$ $h(X) = 4X + 3$
 FIND $\frac{-5}{11}h(f(g(h(-1/4))))$

- A. -5 B. -2 C. 2 D. 11 E. NOTA

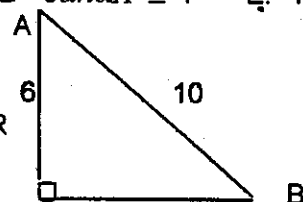
23. THE ODDS AGAINST A SPINNER STOPPING ON YELLOW IS 8 TO 3. WHAT IS THE PROBABILITY OF A SPINNER STOPPING ON YELLOW?

A. $\frac{3}{8}$ B. $\frac{8}{3}$ C. $\frac{3}{11}$ D. $\frac{8}{11}$ E. NOTA

24. SOLVE $|-4X - 2| \leq 18$

A. $4 \leq X \leq -5$ B. $X \leq -5$ or $X \leq 4$ C. $-5 \leq X \leq 4$ D. $X \leq -5$ and $X \leq 4$ E. NOTA

25. FIND THE PERIMETER (P) AND THE AREA (A) OF THE TRIANGLE. WRITE YOUR ANSWER AS AN ORDERED PAIR IN THE FORM (P, A). ANGLE C IS A RIGHT ANGLE.



A. (16, 60) B. (16, 30) C. (22, 36) D. (24, 24) E. NOTA

26. GIVEN THE LINE $3X - 5Y = 10$
ADD: THE SLOPE OF THE GIVEN LINE PLUS THE SLOPE OF A LINE PERPENDICULAR TO THE GIVEN LINE PLUS THE Y-INTERCEPT OF THE GIVEN LINE.

A. $-\frac{3}{15}$ B. $-\frac{46}{15}$ C. $-\frac{64}{15}$ D. $-\frac{66}{15}$ E. NOTA

27. ADAM'S FATHER IS TWO YEARS OLDER THAN HIS MOTHER. ADAM'S AGE IS $\frac{1}{3}$ OF HIS FATHER'S AGE. WHEN ADAM WAS BORN THE SUM OF HIS PARENT'S AGES WAS 42. HOW OLD IS ADAM'S FATHER NOW?

A. 29 B. 31 C. 33 D. 35 E. NOTA

28. ALEXANDRA INVESTS A SUM OF \$2200, PART AT 5% AND THE REST AT 3%. THE ANNUAL INTEREST INCOME ON THE 3% INVESTMENT IS \$46 LESS THAN THE INTEREST INCOME ON THE 5% INVESTMENT. HOW MUCH MONEY WAS INVESTED AT 5%? What is the SUM of the digits in the amount invested at 5%?

A. 1 B. 3 C. 4 D. 5 E. NOTA

29. SOLVE $5R - 3(2R + 5) = 9$ THE SOLUTION IS IN THE RANGE:

A. $-30 < R < -20$ B. $-10 < R < 0$ C. $1 < R < 10$
D. $20 < R < 30$ E. NOTA

30. SOLVE $5 + 3(2R - 5) = 9$ WRITE THE ANSWER AS A REDUCED COMMON FRACTION. STATE THE SUM OF THE NUMERATOR AND DENOMINATOR OF THIS REDUCED FRACTION.

A. 25 B. 17 C. 7 D. 5 E. NOTA