

**Pizitz 2010 Mathematics Tournament**  
**Eighth Grade Written Test**

1. Solve:  $\frac{5}{8}(x - 8) + x = 3x + 2$ .  
A.  $-2\frac{2}{11}$       B.  $-2\frac{2}{3}$       C.  $\frac{2}{3}$       D.  $-5\frac{1}{11}$       E. NOTA
2. Twice an integer increased by fourteen is less than 5. What is the greatest solution?  
A.  $-5$       B.  $-4$       C.  $-4.5$       D.  $-4.6$       E. NOTA
3. If  $8 + 3c = 12$  and  $6a + 9 = 5$ , then what is  $3a^2 + 2ac$ ?  
A.  $-\frac{7}{9}$       B. 0      C.  $-\frac{4}{9}$       D.  $\frac{2}{3}$       E. NOTA
4. What is the twelfth term for the sequence  $\frac{1}{8}, 75\%, 1.375, \dots$ ?  
A. 7.5      B. 7      C.  $6\frac{7}{8}$       D.  $5\frac{5}{8}$       E. NOTA
5. The school supply store buys a gross of pencils for \$8.64, which is 6¢ per pencil. The store sells the pencils for 20¢ each or 3 for 50¢. If half of the pencils are sold individually and half in a bundle of three, then what is the average profit per pencil?  
A.  $12\frac{1}{3}$  ¢      B.  $17\frac{1}{2}$  ¢      C.  $18\frac{1}{3}$  ¢      D.  $11\frac{1}{2}$  ¢      E. NOTA
6. A sack of candy contains 12 brown pieces, 8 yellow pieces, 7 green pieces, and 9 red pieces. What is the probability that Laurelin blindly chooses a brown piece and then a red piece without replacement?  
A.  $\frac{1}{12}$       B.  $\frac{7}{12}$       C.  $\frac{44}{105}$       D.  $\frac{3}{35}$       E. NOTA
7. What is the sum of the x and y intercepts for the graph of the line  $3x - 2y = 5$ ?  
A.  $-4$       B.  $3\frac{1}{2}$       C.  $-\frac{5}{6}$       D. 0      E. NOTA
8. One hundred gold beads, each 20 mm across, are placed side by side in a single layer in the smallest possible square box that is 20 mm tall. What is the volume of the box in cubic centimeters?  
A.  $80\text{ cm}^3$       B.  $800\text{ cm}^3$       C.  $8,000\text{ cm}^3$       D.  $80,000\text{ cm}^3$       E. NOTA
9. An 8 in. by 10 in. picture is reduced to 4 in. by 6 in. What is the percent of decrease in area?  
A. 50%      B. 56%      C. 64%      D. 72%      E. NOTA  
70%

10. The graph of the equation  $2x + 6y = 1$  does not cross which quadrant?
- A. I                      B. II                      C. III                      D. IV                      E. NOTA
11. Simplify:  $-3^2 - (4^2 - 5^2)^2$ .
- A. -72                      B. -90                      C. -1690                      D. -1672                      E. NOTA
12. Simplify, and write in scientific notation:  $\frac{(5.1 \times 10^3)(12 \times 10^3)}{3.4 \times 10^5}$ .
- A.  $1.8 \times 10^4$                       B.  $1.8 \times 10$                       C.  $1.8 \times 10^3$                       D.  $1.8 \times 10^2$                       E. NOTA
13. CJ bought a new baseball glove. It was on sale at 25% off, and the tax was 8%. He paid a total of \$30. What was the original price of the glove?
- A. \$37.50                      B. \$43.20                      C. \$37.04                      D. \$40.50                      E. NOTA
14. It took Mrs. Castleberry one-third of an hour to ride her bicycle at 12 mph to the park. She rode the same route home in half an hour. What was her average speed for the round trip?
- A. 10.6 mph                      B. 10 mph                      C. 9.6 mph                      D. 9 mph                      E. NOTA
15. The areas of three different faces of a rectangular prism are  $18 \text{ cm}^2$ ,  $48 \text{ cm}^2$ , and  $96 \text{ cm}^2$ . What is the volume of the prism?
- A.  $288 \text{ cm}^3$                       B.  $216 \text{ cm}^3$                       C.  $152 \text{ cm}^3$                       D.  $576 \text{ cm}^3$                       E. NOTA
16. Bryan borrowed \$1200 at 4% simple interest rate for 4 months. He will repay the principal and interest in four equal payments. What is the amount of one payment?
- A. \$348                      B. \$303                      C. \$316                      D. \$304                      E. NOTA
17. Line  $m$  has the equation  $3y = 6 + y$ . Line  $n$  is perpendicular to line  $m$  and contains the point  $(4, -2)$ . When graphed, what is the point of intersection for lines  $m$  and  $n$ ?
- A.  $(2, 4)$                       B.  $(4, 3)$                       C.  $(4, 2)$                       D.  $(3, -2)$                       E. NOTA
18. The length and width of a rectangle are in the ratio 3:1. The area is 432 sq. units. What is the perimeter?
- A. 180 units                      B. 54 units                      C. 96 units                      D. 174 units                      E. NOTA

19. To avoid a crowded highway, Mr. Chilton took the side roads. He drove four miles east, five miles north, 1 mile west and then two miles north to his destination. What was the straight distance from his starting point to his destination?
- A.  $\sqrt{58}$  miles      B.  $2\sqrt{37}$       C.  $2\sqrt{29}$  miles      D.  $\sqrt{74}$  miles      E. NOTA
20.  $f(x) = 2x^2 - x$  and  $g(x) = |2x - x^2|$ . What is  $f(3) - g(-6)$ ?
- A. 15      B. -33      C. 67      D. 81      E. NOTA
21. Simplify:  $2(3x^2 + 8x - 5) - (12 - 4x^2 + 9x)$ .
- A.  $2x^2 + 17x - 17$       B.  $10x^2 + 17x - 22$       C.  $6x^2 - x + 7$       D.  $10x^2 + 7x - 22$       E. NOTA
22. A regular polygon has an interior angle measure of  $150^\circ$ . How many diagonals does this polygon have?
- A. 35      B. 54      C. 56      D. 33      E. NOTA
23. At the zoo, Mom bought two drinks and a bag of popcorn for \$5.17, while Dad bought three bags of popcorn and one drink for \$9.06. What would one drink and one bag of popcorn cost?
- A. \$3.88      B. \$3.98      C. \$3.58      D. \$4.88      E. NOTA
24. What is the difference between the least solution and greatest solution for  $6x^2 + 17x + 12 = 0$ ?
- A.  $-17/6$       B.  $1/6$       C.  $17/6$       D.  $-1/6$       E. NOTA
25. What is the area of the smallest scalene triangle whose side lengths are prime numbers?
- A.  $\frac{15\sqrt{3}}{4} u^2$       B.  $\frac{15}{2} u^2$       C.  $\frac{3\sqrt{10}}{4} u^2$       D.  $\frac{3\sqrt{5}}{2} u^2$       E. NOTA

**Tiebreakers** *Please write each tiebreaker answer in the top margin on the back of the scantron.*

- Tiebreaker 1 Annie is  $\frac{1}{3}$  as old as Chuck. Chuck is twice as old as Bill. If the sum of their three ages is 22, how old is Annie?
- Tiebreaker 2 A right triangle with legs measuring 4 cm and 5 cm is rotated about one leg. What is the greatest possible volume of the resulting three-dimensional figure?
- Tiebreaker 3 If  $9^x = 3^{x+2}$ , then what is  $2^{(-x)}$ ?