Pizitz Mathematics Tournament 2011
Eighth Grade Written

1. Solve for x: $8 - 3x > x + 20$

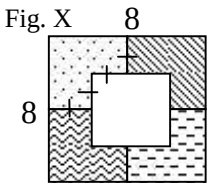
   A. $x < -6$ B. $x < -3$ C. $x > -6$ D. $x > 3$ E. NOTA

2. Which number(s) in the set is/are irrational? $\{-{}^{6}/_{7}, 6.707172\ldots, \sqrt{6}, \pi, 6.7272\ldots\}$

   A. $-{}^{6}/_{7}$ C. $6.707172\ldots$, $\sqrt{6}$, and π

   B. $6.707172\ldots$ and $6.7272\ldots$ D. $\sqrt{6}$ and π E. NOTA

3. Figure X contains four congruent polygons with only right angles, each filled with a different pattern. A thrown dart lands inside Figure X. What is the probability that the dart lands in the zigzag pattern area?



   A. ${}^{3}/_{16}$ C. 25%

   B. ${}^{3}/_{8}$ D. 16% E. NOTA

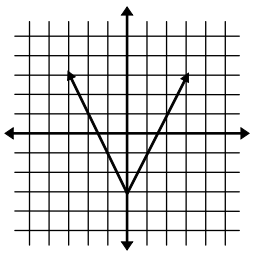
4. A fourteen-year old recently caught a 24-lb. stripped bass in Choccolocco Creek. In how many ways can the letters CHOCCOLOCCO be arranged?

   A. 8,316 B. 6930 C. 19,958 D. 13,860 E. NOTA

5. Given the sequence 1331, 1000, 729, x, y, z, 125, . . . , what is the sum of x, y, z?

   A. 817 B. 1102 C. 943 D. 1071 E. NOTA

6. The graph on the right represents which equation?



   A. $2x + y = -3$ C. $y = x^2 - 3$

   B. $y = |2x| - 3$ D. $y = |2x - 3|$ E. NOTA

7. Write in scientific notation: $\dfrac{(32 \times 10^{7})({}^{1}/_{16} \times 10^{-3})}{0.125 \times 10^{-2}}$.

   A. 1.6×10^{5} B. 16×10^{7} C. 1.6×10^{7} D. 16×10^{6} E. NOTA

8. Solve for x: $-8x - (6 - 5x) = 3(x + 1) - 9$.

   A. 0 B. identity C. no solution D 2. E. NOTA

9. A right triangle has a leg measuring $(x + 4)$. Its hypotenuse measures $\sqrt{2x^2 + 12x + 20}$. What is the measure of its second leg?

   A. $x + 2$ B. $2x + 2$ C. $x^2 + 12x + 4$ D. $x^2 + 4x + 4$ E. NOTA

10. Shirley agreed to a simple interest loan of $480 for ninety days at only 2% daily interest. Shirley repaid the total amount owed in three equal payments. How much was each payment?

A. $288 B. $448 C. $160.80 D. $169.60 E. NOTA

11. Evaluate for $x = -2$, $y = 3$ and $z = -4$: $\dfrac{-5^2 x^3 y^4}{15x^{-3}z^2}$.

A. 8.4375 B. 540 C. –8.4375 D. –540 E. NOTA

12. The graph of $2x + 3y = 12$ is shifted down 3 units. What is the equation of the shifted graph?

A. $2x + y = 12$ B. $2x + 3y = 3$ C. $2x + 3y = 1$ D. $2x + y = 1$ E. NOTA

13. Rex was building a rectangular porch. Laying boards end to end for one length of the porch, he found that eight boards were four feet too long and seven boards were two feet too short. If the porch is 9 ft. wide, what is the area of the porch?

A. 54 ft^2 B. 378 ft^2 C. 396 ft^2 D. 44 ft^2 E. NOTA

14. If $A\clubsuit B = (3A-B)^3$, then what is $(2\clubsuit 8)\clubsuit 6$?

A. –27,000 B. –732 C. –5832 D. –9,000 E. NOTA

15. Solve: $|3x + 4| - 13 < 2x - 7$

A. $x > -2$ or $x < 2$ B. no solution C. all real numbers D. $-2 < x < 2$ E. NOTA

16. Best Painters charges an initial fee of $30 plus $24 per hour. Quality Painters does not have an initial fee and charges $28 per hour. At how many hours is the cost the same for the two companies?

A. 7.25 B. 8 C. $7\,{}^3/_4$ D. 7.2 E. NOTA

17. Charles has 12 alternative rock songs, 3 hip hop mixes, 2 country western ballads and 5 rhythm-and-blues tunes on his *i*-pod. If each selection has an equal chance of being played, and a selection is not repeated, what is the probability that his three selections for listening are an alternative rock song, a country-western ballad and a rhythm-and-blues tune?

A. ${}^1/_{114}$ B. ${}^1/_{57}$ C. ${}^{19}/_{200}$ D. ${}^3/_{200}$ E. NOTA

18. Which function represents exponential decay?

A. $y = {}^1/_2 \cdot (6)^x$ B. $y = -2x^2 - 5$ C. $y = 6 \cdot ({}^1/_2)^x$ D. $x = -2y - 5$ E. NOTA

19. What is the eleventh term in the sequence 256, 128, 64, 32, . . . ?

A. ${}^1/_4$ B. 2 C. –2 D. $-{}^1/_4$ E. NOTA

20. A line passes through the points (3, –4) and (–2, 5). What is the sum of its slope and y-intercept?

A. $^{7}/_{5}$ B. $^{34}/_{5}$ C. $^{7}/_{9}$ D. $-^{2}/_{5}$ E. NOTA

21. Given $\sqrt{2x-4}=8$ and $\dfrac{20}{\sqrt{y+1}}=4$, what is $x + y$?

A. 58 B. 14 C. 24 D. 38 E. NOTA

22. Given the system $\begin{aligned} y &\geq 0.5x \\ y &\leq -0.5x+2 \\ y &\leq x+2 \end{aligned}$, what is the area of the figure formed by the solution of the system?

A. $6\,^{1}/_{2}$ u^2 B. $6\,^{1}/_{4}$ u^2 C. 6 u^2 D. $5\,^{1}/_{2}$ u^2 E. NOTA

23. In a level forest, Jay was in a tree stand 42 ft. above the ground. Looking through his scope, he spotted a deer 50 yards away. How many feet from the base of the tree was the deer?

A. 256 ft. B. 144 ft. C. $3\sqrt{256}$ ft. D. 736 ft. E. NOTA

24. A diameter of a circle has endpoints at (4, 6) and the origin. Which point is also on the circle?

A. (–1, 2) B. (6, 3) C. (5, 0) D. (–1, 1) E. NOTA

25. Mrs. Cato bought a new car for $16,000 five years ago. She used a yearly depreciation of 20% to determine its current value. She deducted an additional $500 before selling it to her neighbor. What did the neighbor pay for the car?

A. $6553.60 B. $4242.88 C. $4742.88 D. $6053.60 E. NOTA

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

TB1. Kim is thinking of an integer. Three times the integer is more than four, and nine is greater than twice the sum of the integer and two. What is the integer?

TB2. Math teachers are not proficient typists. On average, every answer choice took 24 seconds to type. Every problem took 98 seconds to type. Rounded to the nearest minute, how long did it take to type all problems and answers on this test?

TB3. What is the surface area of a sphere with a volume of 288π? Leave pi in the answer.