6^{th} Grade Test

Randolph School Mathematics Tournament

April 25, 2009

1. The area of a square is 225 square units. If the square has the same perimeter as an equilateral triangle, what is the length of the base of the equilateral triangle?
   A. 15 B. 20 C. 25 D. 30

2. The odds in favor of an event occurring is 7:9. What is the probability the event will occur?
   A. $\frac{7}{16}$ B. $\frac{9}{16}$ C. $\frac{14}{25}$ D. $\frac{16}{25}$

3. Write $0.6\overline{3}$ as a fraction in lowest terms.
   A. $\frac{19}{30}$ B. $\frac{7}{11}$ C. $\frac{8}{11}$ D. $\frac{21}{33}$

4. What is the degree measure of the smallest angle formed at 10:40 PM by the hour and minute hands on a clock with a circular face?
   A. 60 B. 80 C. 90 D. 110

5. If you averaged 88% on six tests, what percent would you need to average on the next three tests to bring your test average up to 90%?
   A. 92 B. 93 C. 94 D. 95

6. Simplify: $2\sqrt{169}+\sqrt[3]{216}=$
   A. 5^2 B. 4^3 C. 3^4 D. 2^5

7. Which circle described below has the largest circumference?
   A. diameter is 26 units B. circumference is 27π units
   C. radius is 10π units D. area is 400π square units

8. Evaluate: $\frac{-4^{10}}{4^7}$
   A. –64 B. –12 C. 12 D. 64

9. If $\frac{x}{5}=6$ and $14y=7$, what is the value of $\frac{x}{y}$?
   A. 84 B. 60 C. 42 D. 15

10. A regular octagon has sides of length 7.5. What is the perimeter of the polygon?
    A. 37.5 B. 45 C. 60 D. 75

11. A painted wooden cube is cut into 125 smaller cubes of equal volume. If all the smaller cubes are placed in a bag, what is the probability that one cube selected randomly from the bag has paint on at least one side?
    A. $\frac{81}{125}$ B. $\frac{98}{125}$ C. $\frac{36}{125}$ D. $\frac{49}{125}$

12. If $\prod_{p}^{q} = \frac{p^2}{q}$, solve for x. $\prod_{8}^{4} = \prod_{x}^{9}$.

A. 18 B. 12 C. 16 D. 3

13. How many distinguishable arrangements are possible with the letters in the word "CALCULUS"?

A. 5040 B. 2009 C. 720 D. 240

14. A concrete walk that is 6 feet wide surrounds a circular garden with a diameter of 20 feet. Find the area of the surface of the concrete walk in square feet.

A. 276π B. 256π C. 156π D. 69π

15. Write $\frac{6}{111}$ as a decimal.

A. $0.0\overline{54}$ B. $0.05\overline{4}$ C. $0.\overline{540}$ D. $0.\overline{054}$

16. For what value of z is the equation true? $\dfrac{\frac{z}{5}+1}{6-\frac{z}{3}} = 4$

A. 23 B. 15 C. –23 D. 25

17. Solve for *k*: $8^{25} = 4^{5k}$

A. 10 B. 7.5 C. 5 D. 2.5

18. If a car is traveling at a rate of 88 feet per second, how many miles will it travel in one hour?

A. 80 B. 75 C. 65 D. 60

19. Solve for t: $15 - |2t| = 25 - |-12|$

A. -11 B. 1 C. ± 1 D. no solution

20. Evaluate: $\sqrt{61^2 - 60^2} - \sqrt{41^2 - 40^2}$

A. 51 B. 50 C. 4 D. 2

21. Given that $14x - 21y = 84$, what is the value of $\frac{x}{6} - \frac{y}{4}$?

A. 1 B. 7 C. 12 D. 14

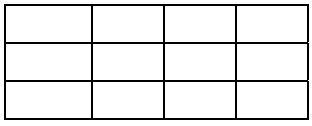
22. The lengths of the three sides of a triangle <u>cannot</u> be

A. 17, 19, 29 B. 27, 28, 29 C. 14, 15, 29 D. 20, 21, 29

23. What is the total number of rectangles in the figure?

A. 45 B. 55

C. 56 D. 60



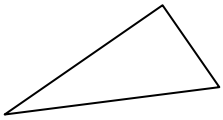
24. If you roll two fair, standard six-sided dice, what is the probability that the sum of the numbers on the top faces will be at least 8?

A. $\frac{1}{3}$ B. $\frac{11}{36}$ C. $\frac{5}{18}$ D. $\frac{5}{12}$

25. How many positive integer divisors does 432 have?

A. 20 B. 32 C. 36 D. 40

26. What is the area in square inches of a right triangle with a hypotenuse of 85 inches and one leg that is 13 inches?



A. 456 B. 546 C. 912 D. 1092

27. What is 13201_4 written as a base ten number?

A. 441 B. 444 C. 481 D. 484

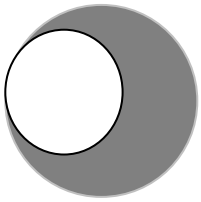
28. What is the average of the squares of the first seven whole numbers?

A. 13 B. 17 C. 20 D. 21

29. Solve for x. $3^5 + 3^5 + 3^5 = x^3$

A. 243 B. 81 C. 27 D. 9

30. The area of the shaded region is 104π cm^2. If the radii of the circles are integers, how long in cm is the diameter of the larger circle?



A. 16 B. 15
C. 32 D. 30

TIE-BREAKERS

1. How many even three-digit integers are greater than 777?

2. Simplify: $\frac{3! \cdot 4!}{4! + 5!}$

3. Solve for x. $\sqrt[6]{\sqrt[3]{9x}} = \sqrt[18]{18081}$