

2010 Cedar Ridge Mathematics Tournament

Eighth Grade Written Test

- Solve:  $5(3x - 7) + 13 = \frac{3}{4}(12x + 8) - 2x$   
A. 0.25      B. 28/5      C. 3.5      D. -22
- If  $G(t) = t^3 - t^2 - 2t$  and  $H(t) = \frac{t-1}{3}$ , find  $G(H(3))$ .  
A.  $\frac{11}{3}$       B.  $\frac{40}{27}$       C.  $\frac{4}{15}$       D.  $\frac{11}{3}$
- Write an equation in standard form of the line that is perpendicular to the line  $x + 2y = 10$  and has the same y intercept as the line  $y - \frac{1}{2}x = 3$ .  
A.  $2x - y = -3$       B.  $y = -2x + 3$       C.  $-2x + y = -3$       D.  $y = 2x - 3$
- Find the value of  $\frac{10!}{2^8 \cdot 3^4}$   
A. 350      B. 35      C. 175      D. 18,900
- Solve:  $\sqrt{x-1} - 3 + x = 0$   
A. 2      B. 5      C. 5, 2      D.  $\frac{(1+i\sqrt{39})}{2}$
- A triangle has an angle with a measure that is half of the largest angle measure and three times the smallest angle measure. If the largest angle measure is  $108^\circ$ , what is the measure of the complement of the smallest angle?  
A.  $36^\circ$       B.  $54^\circ$       C.  $18^\circ$       D.  $72^\circ$
- Four whole numbers have a mode of 14, a range of 11, and a median of 16.5. What is the mean?  
A. 13.83      B. 14.5      C. 18      D. 13.75
- A 42-in flat screen television originally cost \$1200. What was its total cost after a 15% discount and an 8% tax rate were applied?  
A. \$1056      B. \$935.19      C. \$1058      D. \$1101.60
- Solve for X.  $\frac{\frac{(12x+7x-5x+10)}{2} + \frac{(9x-81+72+18x)}{9}}{x+12} = 7$   
A.  $\frac{43}{17}$       B.  $\frac{43}{17}$       C.  $\frac{80}{3}$       D.  $\frac{80}{3}$
- Find the length of the segment joining the points  $(-3,-4)$  and  $(-1,2)$ .  
A.  $2\sqrt{6}$       B.  $\sqrt{52}$       C.  $4\sqrt{13}$       D.  $2\sqrt{10}$
- At what point do these lines intersect:  $2x = 5 + 3y$  and  $3x + 4y = -18$ ?  
A.  $(-3,-2)$       B.  $(2,3)$       C.  $(3,2)$       D.  $(-2,-3)$

12. Alex and Adam are going to the amusement park. They cannot decide in which order to ride the 12 roller coasters in the park. If they only have time to ride 8 of the roller coasters, how many ways can they do this?

- A. 479,001,600      B. 19,958,400      C. 40,320      D. 6,720

13. Carmen is waiting to board a flight to the Bahamas for Spring Break. According to the airline, the flight she is waiting for is on time 80% of the times it flies. What are the odds that the plane will NOT be on time?

- A. 1:4      B. 4:5      C. 4:1      D. 1:5

14. Simplify:  $3\sqrt{75} + 2\sqrt{45} - \sqrt{147}$ .

- A.  $25\sqrt{3} - \sqrt{147}$       B.  $8\sqrt{3} + 6\sqrt{5}$       C.  $15\sqrt{3} + 6\sqrt{5} - \sqrt{147}$       D.  $-5\sqrt{27}$

15. If  $M = \{\text{even whole numbers less than 10}\}$ ,  $N = \{\text{non-negative integers}\}$ , and  $P = \{\text{primes less than 10}\}$ , what is  $(N \cap M) \cup P$ ?

- A.  $\{2,3,4,5,6,7,8,9\}$       B.  $\{0,2,3,4,5,6,7,8\}$       C.  $\{0,2,3,4,5,6,7,8,9\}$       D.  $\{2,3,4,5,6,7,8\}$

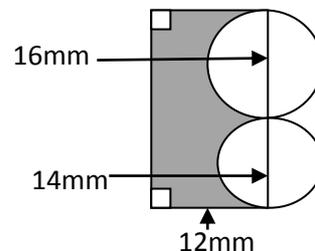
16. Simplify:  $\frac{(80 \times 10^{15})(.002 \times 10^{-3})}{400 \times 10^{-10}}$ .

- A.  $4 \times 10^2$       B.  $.16 \times 10^{12}$       C.  $4 \times 10^{18}$       D.  $4 \times 10^{22}$

17. Alicia and Katie are addressing registration packets for the Cedar Ridge Math Tournament. Alicia can address and prepare one packet every 30 seconds and Katie can address and prepare one packet every 40 seconds. How long will it take them to address 140 packets?

- A. 42 minutes      B. 2340 seconds      C. 40 minutes      D. 2500 seconds

18. Find the area of the shaded region. Use  $\pi = 3.14$ . Round to the nearest tenth. (Answers are in square mm.)



- A. 182.6      B. 265.8      C. 312.9      D. 354.8

19. If  $4x = 20$ ,  $2x + y = 18$ , and  $3xy - z = 100$ , what is  $z - (x - y)$ ?

- A. 17      B. 7      C. 23      D. 33

20. The area of a rectangle is  $12x^2 - 21x - 6$ . The width is  $3x - 6$ . What is the length?

- A.  $4x - 1$       B.  $4x + 1$       C.  $9x + 1$       D.  $12x - 18$

21. If  $A = \begin{Bmatrix} -1 & 5 & 9 \\ 0 & -4 & -2 \\ 3 & 7 & 6 \end{Bmatrix}$ ,  $B = \begin{Bmatrix} -12 & 7 & -16 \\ 5 & 10 & 13 \\ 20 & 11 & 8 \end{Bmatrix}$ , find  $2B + A$ .

- A.  $\begin{Bmatrix} 24 & 14 & 32 \\ 10 & 20 & 26 \\ 40 & 22 & 16 \end{Bmatrix}$       B.  $\begin{Bmatrix} -13 & 12 & -7 \\ 5 & 6 & 11 \\ 23 & 18 & 14 \end{Bmatrix}$

$$C. \begin{Bmatrix} -2 & 10 & 18 \\ 0 & -8 & -4 \\ 6 & 14 & 12 \end{Bmatrix} \quad D. \begin{Bmatrix} -25 & 19 & -23 \\ 10 & 16 & 24 \\ 43 & 29 & 22 \end{Bmatrix}$$

22. If the cube has a surface area of  $96a^2$ , what is its volume?

- A.  $32a^3$                       B.  $48a^3$                       C.  $64a^3$                       D.  $96a^3$

23. What is the perimeter of a square whose diagonal measures 10 centimeters?

- A.  $10\sqrt{2} \text{ cm}$               B.  $20\sqrt{2} \text{ cm}$               C.  $25\sqrt{2} \text{ cm}$               D. 80 cm

24. The solution in a 9 liter radiator system is 25% antifreeze. How much solution must be drained and replaced by 100% antifreeze to obtain a 50% solution?

- A. 3 liters                      B. 2.25 liters                      C. 4.5 liters                      D. .75 liters

25. Find the area of the rectangle.

- A.  $16\sqrt{2} - 4\sqrt{6} \text{ units}^2$     B.  $16\sqrt{3} - 18 \text{ units}^2$      $\sqrt{6}$   
 C.  $32\sqrt{3} - 18 \text{ units}^2$     D.  $2\sqrt{32} - 18 \text{ units}^2$

$$2\sqrt{32} - 3\sqrt{6}$$



#### TIEBREAKERS

TB1: A specific program requires the user to enter a 5-digit password. The digits cannot repeat and can be any five of the digits 1, 2, 3, 4, 7, 8, and 9. What is the probability that the first two digits are odd numbers with the other digits any of the remaining numbers?

TB2: The price of a stamp changed from 37 cents to 39 cents. To the nearest hundredth, what was the percent of increase?

TB3: Solve:  $(4a - 1)(a - 2) = 7a - 5$