

**2010 Hoover HS Math Tournament  
Pre-Algebra Written Test**

1. If  $\sqrt{8}$  and  $\pi$  and  $\sqrt{5.3}$  are examples of irrational numbers, how many irrational numbers are in the interval from 1 to 10, inclusive?

- a) 6                      b) 7                      c) 10                      d) infinite                      e)NOTA

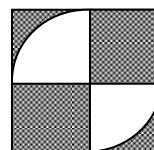
2. If  $a @ b = a^2 - b^2$ , find the value of  $(-3 @ -3) @ -3$

- a) 9                      b) -9                      c) 27                      d) 18                      e)NOTA

3. Basket Bob has made 4 out of 12 free throws. How many more does he need to make in order to have made 50%? ( assume he makes all of the next shots )

- a) 4                      b) 2                      c) 6                      d) 8                      e)NOTA

4. Find the shaded area if the un-shaded area is a total of  $8\pi$  square units.



- a)  $16 - 8\pi$                       b)  $32 - 8\pi$                       c)  $64 - \pi$                       d)  $64 - 8\pi$                       e)NOTA

5. Find the coordinate of a point that is equal distance from point B ( 3 , -10 ) and C ( - 9 , 12 ).

- a) (-6 , 2)                      b) ( -7 , 3 )                      c) ( -7/2 , 3/2 )                      d) ( -3 , 1 )                      e)NOTA

6. Find the length of the longest segment that would fit inside a 2in. by 3in. by 4 in. rectangular prism.

- a)  $\sqrt{29}$  in.                      b) 3 in.                      c) 29 in.                      d)  $2\sqrt{6}$  in.                      e)NOTA

7. Find the length of the segment interior to the parabola  $y = x^2$  that is created by the line  $y = 9$ .

- a) 9units                      b) 3 units                      c) 6 units                      d) 81units                      e)NOTA

8. If  $\log_2 a = 10$  and  $\log_3 b = -3$ . Find the value of :  $5 \log_2 a - 2 \log_3 b$

- a) 1                      b) 44                      c) 4                      d) 56                      e) NOTA

9. Solve :  $(\frac{1}{2})(x-2) + (3)(3-x) = (\frac{1}{4})(x-4)$

- a) -24                      b)  $\frac{99}{4}$                       c) 36                      d)  $\frac{36}{11}$                       e)NOTA

10. Write  $.01\overline{2}$  as a fraction in lowest terms:

- a)  $\frac{12}{99}$                       b)  $\frac{122}{999}$                       c)  $\frac{12}{90}$                       d)  $\frac{12}{900}$                       e)NOTA

11. Find the area of the circle whose diameter is the segment that connects the x-intercept and the y-intercept for the line:  $3x - 4y = 36$

a)  $\frac{15}{2}\pi$                       b)  $21\pi$                       c)  $\frac{225}{4}\pi$                       d)  $15\pi$                       e)NOTA

12. For real values of x and y, what must always be true for :  $y = \sqrt{\frac{x}{2}}$

a)  $y \geq x$                       b)  $x \geq y$                       c)  $y \geq 0$                       d)  $y \geq 1$                       e)NOTA

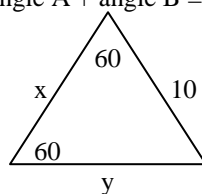
13. If  $a + b = -13$  and  $b = 12$ , find  $a - b$  :

a)  $-25$                       b)  $-37$                       c)  $3$                       d)  $37$                       e)NOTA

14. In isosceles trapezoid ABCD, base angles A and D have a sum of 157 degrees. What must be true?

a) angle A = angle B                      c) angle B + angle C =  $203^\circ$                       e)NOTA  
b) angle B + angle C =  $180^\circ$                       d) angle A + angle B =  $90^\circ$

15. The sides and angles of a triangle are shown.  
Find  $x + y$



a) 20                      b) 30                      c) 60                      d) 180                      e)NOTA

16. If  $x$  and  $y$  are integers and  $x > 0$  and  $y < 0$  what must be true?

a)  $x + y > 0$                       b)  $x - y < 0$                       c)  $y - x > 0$                       d)  $y - x < 0$                       e)NOTA

17. The sides of a convex regular polygon are all some odd integer amount. If the perimeter is an even value, how many sides might the shape have?

a) 2                      b) 3                      c) 4                      d) 5                      e)NOTA

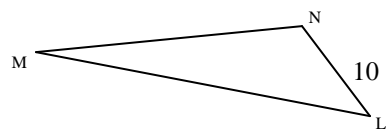
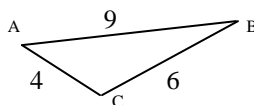
18. A football is thrown such that its height is given by the equation:  $h = -\frac{1}{2}t^2 + 6t + 5$ . If  $h$  represents height in feet and  $t$  represents time in seconds, find the height of the ball after 8 seconds

a) 21 ft.                      b) 45 ft.                      c) 49 ft.                      d) 15 ft.                      e)NOTA

19. Three number cubes are rolled at the same time. Find the probability that the numbers 1 and 2 and 3 are rolled. Order does not matter.

a)  $\frac{1}{3}$                       b)  $\frac{1}{216}$                       c)  $\frac{1}{18}$                       d)  $\frac{1}{36}$                       e)NOTA

20. If  $\triangle ABC \sim \triangle LMN$ ,  
find the perimeter of  $\triangle LMN$ .



- a) 22 units                      b) 42.5 units                      c) 37 units                      d) 47.5 units                      e)NOTA
21. A circle with a radius of 5 units is drawn such that it crosses the x-axis at (2,0) and (8,0). What point could be the center of the circle?
- a) (4,5)                      b) (5,4)                      c) (5,7)                      d) (5,2)                      e)NOTA
22. A restaurant only has tables that seat 2 and tables that seat 4 and tables that seat 6. There are twice as many 4 seaters as there are 2 seaters and there are half as many 6 seaters as there are 2 seaters.. What is the total minimum number of tables needed to seat 260 people?
- a) 20                      b) 60                      c) 22                      d) 70                      e)NOTA
23. Three solid metal spheres are melted and formed into one big sphere. If the original spheres had radii of 3 in. , 4in , 5 in. Find the radius of the new big sphere.
- a) 6 in.                      b) 5.5 in.                      c)  $6\sqrt{2}$  in.                      d)  $6\sqrt{3}$  in.                      e)NOTA
24. How many diagonals does a regular octagon have?
- a) 40                      b) 64                      c) 80                      d) 20                      e)NOTA
25. A truck must go over a steep hill. The truck drives 2 miles up one side at 10 mph and 2 miles down the other side at 40 mph. Find the truck's average speed to go over the hill.
- a) 12.5 mph                      b) 25 mph                      c) 16 mph                      d) 50 mph                      e)NOTA

TB1: Find the average of the quantities:  $4x$  ,  $3x + 2$ , 10 and  $9x$

TB2: Find  $\frac{1}{3}\%$  of 330.

TB3: The average of 6 numbers is 12. Find the sum of those 6 numbers.