2006 Hoover HS Math Tournament
Pre-Algebra Written Test

1. A cube of wood is painted on all six sides. The cube is then cut into 27 congruent smaller cubes. How many of the 27 smaller cubes have paint on only two sides?

a) 6 b) 12 c) 8 d) 26 e)NOTA

2. When ninety two is divided by six, what would the sum of the remainder and divisor be?

a) 15 b) 21 c) 17 d) 8 e)NOTA

3. Find $(10110110_2 + 11101101_2) = ?_{10}$

a) 11 b) 22 c) 121 d) 419 e)NOTA

4. Three consecutive even integers have an average of 92. Find the positive difference between the largest and smallest of the three numbers.

a) 3 b) 2 c) 12 d) 4 e)NOTA

5. Three fourths of a truck is covered in mud. If half of the mud gets washed off, what fraction of the truck has no mud on it?

a) $\frac{5}{8}$ b) $\frac{1}{2}$ c) $\frac{3}{8}$ d) $\frac{5}{12}$ e)NOTA

6. Twelve more than half a number is equal to twice the number. Find the number.

a) 24 b) 12 c) 8 d) 4 e)NOTA

7. An isosceles trapezoid has bases of 18 and 14. Find the sum of the trapezoid's two non-congruent angles.

a) 90^0 b) 60^0 c) 180^0 d) 360^0 e)NOTA

8. 750 is what percent of 100 ?

a) 75% b) 650% c) 750% d) .075% e)NOTA

9. Five belts and five hats cost a total of $30. What would be the total cost of two belts and two hats?

a) $ 25 b) $ 6 c) $ 15 d) $ 12 e)NOTA

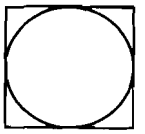
10. The ratio of cars to vans in a parking lot is 9:11. If there are 80 total cars and vans, how many are cars?

a) 36 b) 20 c) 2 d) 71 e)NOTA

11. How many total squares would be on a 5 square by 5 square checker board?

a) 10 b) 25 c) 100 d) 55 e)NOTA

12. Find the ratio of the area of the circle to the area of the square



a) $\frac{\pi}{4}$ b) $\frac{\pi}{1}$ c) $\frac{\pi}{2}$ d) $\frac{2}{\pi}$ e)NOTA

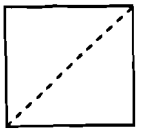
13. A circle is cut into four congruent parts. If the area of one part is 9π, find the diameter of the original circle.

a) 36 b) 9 c) 6 d) 12 e)NOTA

14. Five peas equal one pod. Four pods equal ½ ping. Three pings equal how many peas?

a) 20 b) 40 c) 50 d) 60 e)NOTA

15. A square is cut in half as shown. Find the ratio of the perimeter of one triangle to the perimeter of the square.



a) $\frac{2+\sqrt{2}}{4}$ b) $\frac{1}{2}$ c) $\frac{3}{4}$ d) $\frac{\sqrt{2}}{2}$ e)NOTA

16. If $a @ b = \frac{a+b}{a-b}$, find $(x+1) @ (x-1)$

a) 2x+2 b) 2x c) 0 d) x e)NOTA

17. A triangle has sides of 14 and 27. What is the least possible integral measure of the third side?

a) 3 b) 13 c) 12 d) 14 e)NOTA

18. Find the sum of the positive integers from 1 to 400 inclusive.

a) 401 b) 16000 c) 200050 d) 25000 e)NOTA

19. If four more than a number is seventeen less than another number, what is the positive difference of the two numbers?

a) 13 b) 20 c)7 d) 21 e)NOTA

20. The average of 4 numbers is 125. The average of 6 other numbers is 100. Find the average of the ten numbers.

a) 22.5 b) 112.5 c) 110 d) 225 e)NOTA

21. The perimeter of a right triangle is doubled. The area of the right triangle would then increase by a factor of:

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

22. Find the arithmetic mean of all the two digit, positive integer multiples of four.

a) 54 b) 108 c) 44 d) 96 e)NOTA

23. Bonnie's dog Ditto weighs 30 pounds more than $\frac{2}{5}$ of its own weight. How much does Ditto weigh?

a) 40 pounds b) 50 pounds c) 20 pounds d) 75 pounds e)NOTA

24. Find the distance between the x-intercept and y-intercept for the line $y = -3x - 10$.

a) 14 b) 12 c) 10 d) 1 e)NOTA

25. An empty gas tank can hold 24 gallons of gas. If it takes 5 minutes to pump g gallons, how many minutes will it take to fill the tank?

a) $\frac{120}{g}$ b) $\frac{5}{g}$ c) $\frac{5g}{24}$ d) $\frac{5}{24g}$ e)NOTA

Tie Breakers:

TB1 How many diagonals does a regular 14 sided polygon have?

TB2 What is the sum of the coordinates of the point (4 , -2) after it is rotated 180 degrees about the origin?

TB3 How many unique ways can the letters in the word MATH be arranged?