2007 Hoover HS Math Tournament
Pre-Algebra Written Test

1. Evaluate: $3^2 + 3(2-3) + 2^3$

a) 14 b) 12 c) 8 d) -4 e)NOTA

2. Write $.0\overline{7}$ as a fraction in lowest terms.

a) $\frac{7}{10}$ b) $\frac{7}{90}$ c) $\frac{7}{99}$ d) $\frac{77}{99}$ e)NOTA

3. Find the probability of choosing a number R from the set R = {0,1,2,3,4,5,6,7,8,9} such that 32,3R4 is divisible by 6.

a) $\frac{4}{5}$ b) $\frac{2}{5}$ c) $\frac{3}{5}$ d) $\frac{1}{10}$ e)NOTA

4. If $a - b = 6$ and $ax + 2x - bx = 16$, find x.

a) 6 b) 12 c) 2 d) 8 e)NOTA

5. Find x $(4^x)(64)(8) = 2^8$

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

6. How many times does the graph of the function $y = x^2 - 6$ cross the x-axis?

a) 6 b) 1 c) 2 d) 0 e)NOTA

7. What is the probability that the total obtained after rolling a pair of dice is a non-prime number?

a) $\frac{1}{2}$ b) $\frac{11}{18}$ c) $\frac{5}{12}$ d) $\frac{7}{12}$ e)NOTA

8. According to the journal of pediatric medicine, a child's weight should increase by 10% each month. If a child has a current weight of 6 lbs. 4 oz., how much will she weigh in 2 months?

a) 7 lbs. 6oz. b) 7 lbs. 9oz. c) 7 lbs. 8oz. d) 120 lbs. e)NOTA

9. A class of junior high mathematicians developed a new way to measure angles called slices. The sum of the angles of a scalene right triangle is 200 slices. The sum of the angles of a pentagon equals _____ slices.

a) 400 b) 360 c) 540 d) 600 e) NOTA

10. If A = B+1 and B=2C+2 and C = 3A+3 find A.

a) $-\frac{9}{5}$ b) 2 c) $-\frac{1}{2}$ d) 6 e)NOTA

11. Farmer Ted walks 50 yards around the circumference of his circular field. If this is 1/10 of the total circumference, what is the area of his field?

a) $\frac{10}{\pi}$ b) $\frac{500}{\pi}$ c) 2500π d) $\frac{62500}{\pi}$ e)NOTA

12. A circle is placed perfectly inside a square. Find the ratio of the area of the shaded region to the area of the un-shaded region.

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

13. If point A (2 ,5) is rotated 90^0 ccw about the origin and then reflected across the line y =x, which quadrant will the resulting point be in?

a) I b) II c) III d) IV e)NOTA

14. What is the sum of the numbers in the 5^{th} row of Pascal's triangle?

a) 5 b) 10 c) 16 d) 32 e)NOTA

15. At which of the following times is the obtuse angle formed by the hour and minute hand of a clock equal to 105^0?

a) 4:00 b) 1:30 c) 9:30 d) 10:15 e)NOTA

16. The price of an item is reduced by $\frac{1}{4}$ and then by $55.\overline{5}\%$. What would the total percent decrease in price be?

a) 74 % b) $66.\overline{6}$ % c) $33\overline{3}$ % d) 86.1 % e)NOTA

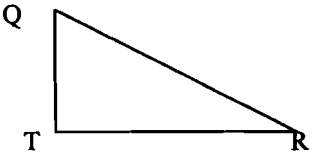
17. Find the area of the region bounded by the graphs of $y > 0$, $x > 0$, and $y < -\frac{1}{2}x + 8$.

a) 32 units^2 b) 64 units^2 c) 128 units^2 d) 16 units^2 e)NOTA

18. Jack and Jill leave the same hill at the same time. Jack heads due north at 3 mph. Jill heads due east at 4 mph. How many hours does it take for them to be 20 miles from each other?

a) 3.5 hrs. b) 4 hrs. c) 2 hrs. d) 3 hrs. e)NOTA

19. If Sin Q = $\frac{TR}{QR}$ and Cos Q = $\frac{QT}{QR}$ Find: $\frac{SinQ}{CosQ}$



a) 1 b) $\frac{QR}{QT}$ c) $\frac{TR}{QT}$ d) $\frac{QT}{TR}$ e)NOTA

20. The mean of $\frac{2}{3}$, $\frac{3}{4}$, and $\frac{x}{5}$ is $\frac{41}{36}$. Find x.

a) 18 b) 6 c) 60 d) 10 e)NOTA

21. The number halfway between $\frac{2}{3}$ and $\frac{12}{9}$ is:

a) 1 b) $\frac{7}{6}$ c) $1\frac{1}{2}$ d) $\frac{7}{12}$ e) NOTA

22. A 40 inch diameter tire with a width of 6 in. is rolled up against a 90^0 corner. Find the volume of the space formed by the tire and the corner.

a) 400π in.^{3} b) 1800π in.^{3} c) $400 - 100\pi$ in.^{3} d) $2400 - 600\pi$ in.^{3} e) NOTA

23. If x and y are both integers with $x > 0$ and $y < 0$, which of the following must always be true?

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

24. A bug on a road is squashed by a rolling car tire. If the bug is now stuck to the 30 inch diameter tire, how far is the bug from its original position after 2 ½ revolutions?

a) $15\sqrt{4 + 25\pi^2}$ in. b) $30\sqrt{1+\pi^2}$ in. c) $30\pi\sqrt{2}$ in. d) $15\sqrt{1+4\pi}$ in. e)NOTA

25. A circle with a radius of 5 units has a center P(3 , 4). Find the coordinate on the circle that is farthest from the origin.

a) (8, 6) b) (6 , 8) c) (7 , 12) d) (10 , 0) e)NOTA

TB1 Find all answers for r: $3\,r(4-r) - 3r(r-4) = 3\,r$

TB2 Evaluate $(3.2 \times 10^5 + 4.4 \times 10^4)^2$. Write answer in scientific notation.

TB3 Find the last 2 digits of 5^{347}