

2009 Hoover HS Math Tournament
Pre-Algebra Written Test

1. A hiker leaves camp heading due north at 8 mph. After 45 minutes he turns and heads due east at 3 mph. After 20 minutes of walking east he stops, turns and heads straight toward camp. How many miles is the walk back to camp?

a) $\sqrt{37}$ b) 37 c) 7 d) 11 e)NOTA

2. If $a = \frac{3}{4}$ and $b = \frac{4}{3}$ then $(a - b)(b - a) = ?$

a) $\frac{-25}{144}$ b) $\frac{49}{144}$ c) $\frac{-49}{144}$ d) $\frac{7}{12}$ e)NOTA

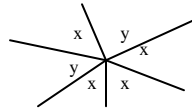
3. A class of 14 boys and 8 girls receives some new girl students. If the class is now 65% girls, how many girls were added?

a) 16 b) 26 c) 14 d) 18 e)NOTA

4. A tractor has 4 foot diameter tires at the rear and 2 foot diameter tires at the front. As the tractor moves, how many times do the front tires rotate compared to one rotation of the rear?

a) $\frac{1}{2}$ rotation b) 6 rotations c) $\frac{1}{4}$ rotation d) 2 rotations e)NOTA

5. In the shape, if $y = 55$ degrees, find x .



a) 55^0 b) 250^0 c) 62.5^0 d) 125^0 e)NOTA

6. If 25% of W is 40% of K , then W is what percent of K ?

a) 130% b) 160% c) 65% d) 15% e)NOTA

7. Solve for x : $3x - 3(3x - 3) = 33$

a) 3 b) 1 c) -4 d) 8 e)NOTA

8. If a and b are both integers and $a \neq b$, then which of the following cannot be true?

a) $a - b = 0$ b) $a + b = 0$ c) $a + b = 1$ d) $a - b = 1$ e) NOTA

9. The average of Paul's 5 test grades is a 78%. What does Paul need to make on his 6th test to have an 80% test average?

a) 100% b) 82% c) 86% d) 90% e)NOTA

10. The average of x , y and z is x . Find the average of y and z .

a) x b) $\frac{yz}{2}$ c) z d) $2x$ e)NOTA

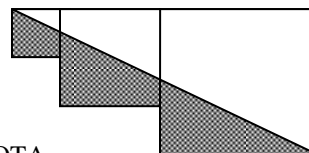
11. How many seconds longer is 20 % of an hour than 30% of a minute?

- a) 50 seconds b) 54 seconds c) 18 seconds d) 30 seconds e)NOTA

12. Quadrilateral ABCD has vertices A (4 , -3) , B (1 , 12) , C (-8 , 7) , D (-6 , 8). Which vertex is farthest from the origin?

- a) A b) B c) C d) D e)NOTA

13. Three squares are placed side by side as shown.
The squares have sides of 1 cm, 2 cm and 3cm.
Find the area of the shaded region.



- a) 5 cm^2 b) 3 cm^2 c) 2.75 cm^2 d) 6 cm^2 e)NOTA

14. A cab driver charges a flat rate of \$1.50 plus \$2 each half mile. If a ride costs \$32.25, how far was the ride?

- a) $16 \frac{1}{10}$ miles b) $15 \frac{3}{8}$ miles c) $7 \frac{1}{2}$ miles d) $7 \frac{11}{16}$ miles e)NOTA

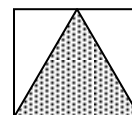
15. If $\sum_{n=2}^5 n$ means $2+3+4+5$, find the value of $\sum_{n=3}^7 n$.

- a) 25 b) 37 c) 21 d) 15 e)NOTA

16. Find the value of n: $5^n + 5^n + 5^n + 5^n + 5^n = 5^5$

- a) 1 b) 2 c) 4 d) 5 e)NOTA

17. Find the area of the square if the shaded region has an area of 27.2 units^2 .



- a) 81.6 units^2 b) 13.6 units^2 c) 54.4 units^2 d) 27.2 units^2 e)NOTA

18. What are the odds of getting Mrs. Nicehair for math if 25% students get her for math?

- a) 3 to 4 b) 1 to 4 c) 2 to 3 d) 1 to 3 e) NOTA

19. The line $y = 2x + 14$ is drawn such that it overlaps a diagonal of a square. Which of the following could be the equation of the line that overlaps the other diagonal?

- a) $y = 2x - 14$ b) $y = -2x + 14$ c) $y = \frac{1}{2}x - 14$ d) $y = -\frac{1}{2}x + 14$ e)NOTA

20. The graph of the polynomial function, $f(x) = -23x^4 - 12x^2 + 2x - 16$ crosses the y-axis at which point?

- a) (-23 , 0) b) (0 , -12) c) (-16 , 0) d) (0 , -16) e)NOTA

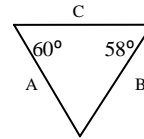
21. How many ways can a single straight line be drawn to divide a square into two shapes with equal areas?

- a) 2 b) 3 c) 4 d) 1 e)NOTA

22. A dog is chained to the corner of an 18ft. by 18 ft. square barn. The chain is 20ft. long. If the dog can roam free outside the barn, find the area which the dog can roam in.

- a) $302\pi \text{ ft}^2$ b) $402\pi \text{ ft}^2$ c) $400\pi \text{ ft}^2$ d) $301\pi \text{ ft}^2$ e)NOTA

23. For the triangle shown, which statement is true?



- a) side A is longest b) side B is shortest c) side C is longest d) all sides are equal e)NOTA

24. Which of the following is equivalent to: $6! \cdot 7!$

- a) $10!$ b) $13!$ c) $42!$ d) $8!$ e)NOTA

25. Simplify : $\sqrt{\sqrt{\frac{(2 \times 10^{10})(6 \times 10^{15})}{1200 \times 10^3}}}$

- a) 1×10^{20} b) 1×10^{10} c) 1×10^5 d) 1×10^4 e)NOTA

TB1 What is the ten thousandths place value of π ?

TB2 Find the sum of the integers from 100-200 inclusive.

TB3 What percent, rounded to the nearest whole number, of the letters of this sentence are vowels?