2014 Hoover High School Mathematics Tournament
6th Grade Written Test

1. Simplify $15 + 6 \div 3 + 4$
A) 3 B) 11 C) 21 D) 28 E) NOTA

2. Write $\frac{2014}{5}$ as a decimal.
A) 42.8 B) 402.8 C) 43.8 D) 403.8 E) NOTA

3. What is 100% of 10% of 1% of 1% of 1?
A) 0.000001 B) 0.0001 C) 0.00001 D) 0.0000001 E) NOTA

4. One leg of a right triangle is 12 and the hypotenuse is 20. Find the area of the triangle.
A) 90 B) 96 C) 72 D) 120 E) NOTA

5. A clock stopped at 8:00 p.m. What is the largest measure (in degrees) of the angle formed by the hour and minute hands?
A) 90 B) 20 C) 240 D) 120 E) NOTA

6. For this set of data {1,16,2,5,4,5,3,5,6,7,1} *A* is the mean, *B* is the median and *C* is the mode. Find $\frac{AB}{C}$
A) 5 B) 55 C) 11 D) 21 E) NOTA

7. A dragonfly ate a total of 1050 mosquitoes on four consecutive nights. Each night she ate 25 more than on the night before. How many did she eat the third night??
A) 225 B) 262 C) 275 D) 300 E) NOTA

8. When the radius of a circle is increased by 100%, by what percent is the area increased?
A) 100% B) 200% C) 300% D) 400% E) NOTA

9. Richard, Jeremy and Danny entered a 3K race. Danny finished last with the time of 6 minutes. If Jeremy finished 21 seconds before Danny, and Richard finished 47 seconds before Jeremy, what was Richard's finishing time? (in seconds)
A) 292 B) 313 C) 339 D) 340 E) NOTA

10. A rectangular floor is completely covered with tiles that measure 1m by 2m. If the tiles cannot be cut and do not overlap, which dimensions of the following are not those of this floor?
A) 4m by 9m B) 8m by 8m C) 11m by 7m D) 11m by 10m E) NOTA

11. The earth is 92,960,000 miles from the sun. How many days would it take a rocket travelling at 29,050 mph to go from the earth to the sun?

A) $133\frac{1}{3}$ B) 3200 C) 320 D) 160 E) NOTA

12. Rank these numbers from highest to lowest: $\pi, 1, e, \varphi$

A) $\pi, 1, e, \varphi$ B) $\pi, e, 1, \varphi$ C) $\pi, e, \varphi, 1$ D) $\pi, 1, \varphi, e$ E) NOTA

13. If $X \circledast Y$ means $2Y + X$, find $4 \circledast (2 \circledast 3)$

A) 30 B) 24 C) 20 D) 15 E) NOTA

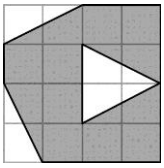
14. Yilan has three boxes of letters: The first box contains the six letters in the word "bubble," the second box has the three letters in the word "zoo," and third contains the four letters in the word "taxi." If she randomly selects one letter from each of the three boxes, what is the probability that the three letters spell the word "box?"

A) $\frac{1}{72}$ B) $\frac{1}{8}$ C) $\frac{3}{4}$ D) $\frac{1}{12}$ E) NOTA

15. What is the sum of all of the prime numbers less than 35?

A) 160 B) 161 C) 137 D) 154 E) NOTA

16. This figure shows 1 square inch. The area of each small square equals $\frac{1}{16}$ of a square inch. Write a fraction for the unshaded area of the drawing.



A) $\frac{3}{16}$ B) $\frac{3}{4}$ C) $\frac{13}{16}$ D) $\frac{5}{8}$ E) NOTA

17. Will buys a meal at a local chicken restaurant. It was $8.90 not including 10% tax. If he pays with a $10 bill, what is the fewest number of coins that could make up his change?

A) 0 B) 1 C) 2 D) 3 E) NOTA

18. If $\sqrt{2+\sqrt{2}} = a$, what is $\sqrt{10+\sqrt{50}}$ in terms of a?

A) $5a$ B) $\sqrt{5a}$ C) $a\sqrt{5}$ D) $25a$ E) NOTA

19. Isaac built a snowman 100 inches tall by stacking three spheres of snow. The middle sized sphere had a diameter that was 75% of the largest sphere's diameter. The smallest sphere had a diameter half the size of the middle sized sphere's diameter. What was the circumference of the great circle of the smallest sphere in inches and in terms of π?

A) $\frac{300\pi}{17}$ B) 75π C) $\frac{30\pi}{17}$ D) $\frac{600\pi}{17}$ E) NOTA

20. What is the ratio of the perimeter to the area of a rectangle having a diagonal of 13 inches and a width of 5 inches?

A) 2: 5 B) 36:65 C) 5:13 D) 17:30 E) NOTA

21. Write $\frac{\frac{3}{8}+\frac{1}{5}}{\frac{2}{3}-\frac{1}{2}}$ as an improper fraction.

A) $\frac{4}{13}$ B) $\frac{69}{20}$ C) $\frac{21}{13}$ D) $\frac{21}{11}$ E) NOTA

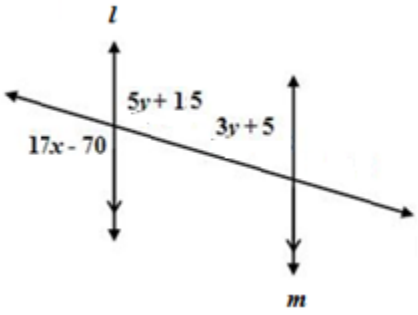
22. A school has a hall with 1000 lockers, all of which are closed. One thousand students start down the hall. The first student opens every locker. The second student closes all the lockers that are multiples of 2. The third student changes (closes an open locker or opens a closed one) all multiples of 3. The fourth student changes all multiples of 4, and so on. After all students have finished with the lockers, how many lockers are closed?

A) 961 B) 945 C) 1000 D) 969 E) NOTA

23. Which statement is always true for all real numbers a?

A) $|-a| > a$ B) $-a^2 = a^2$ C) $|a| = a$ D) $|-a| = a$ E) NOTA

24. Lines ***l*** and ***m*** are parallel lines. Find x.



A) $\frac{155}{17}$ B) $\frac{185}{17}$ C) $\frac{175}{17}$ D) $\frac{205}{17}$ E) NOTA

25. How many different isosceles triangles are possible if the sides must have whole-number lengths and the perimeter must be 93 inches?

A) 22 B) 23 C) 24 D) 25 E) NOTA

Tiebreakers

TB1. Simplify $20^1 + 20^0 + 1^{20}$

TB2. What is the sum of all of the different prime factors of 72?

TB3. Given that a circle inscribed in a square has area 36π, what is the perimeter of the square?