

1998 Hoover High School Math Tournament
7th Grade Math Written Test
February 21, 1998

1. A circular rug with radius 4 ft is on a rectangular floor that measures 10 ft by 12 ft. What area is not covered by the rug?

- A. $120 - 4\pi$ B. $120 - 8\pi$ C. $120 - 12\pi$ D. $120 - 16\pi$ E. none of these

2. A group of 9 friends - 5 boys and 4 girls - are going to a movie. How many different ways can they stand in line for tickets if no two people of the same gender are standing next to each other?

- A. 2 B. 5 C. 20 D. 126 E. none of these

3. 130 is what percent of 780?

- A. 16% B. $16\frac{1}{3}\%$ C. $16\frac{2}{3}\%$ D. 17% E. none of these

4. If $a \otimes b = ab - b^2 + 2a$, then find $3 \otimes 4$.

- A. 1 B. 2 C. 3 D. 4 E. none of these

5. Mandy owns 26% of an orchard. Katie owns 66 acres, and Jennifer owns the rest. If Mandy and Katie together own 70% of the orchard, how many acres does Jennifer own?

- A. 40 acres B. 45 acres C. 50 acres D. 55 acres E. none of these

6. $\left(7 \times 14 + 3 \times 6 \div 2 - 8 \times 4 + 1 \div \frac{1}{6}\right) = (?)$

- A. 81 B. 402 C. $\frac{1181}{6}$ D. 7074 E. none of these

7. If the average of n numbers is n , then their sum is:

- A. $\frac{n}{2}$ B. n C. $2n$ D. n^2 E. none of these

8. Simplify:

$$1 + \frac{1}{2 + \frac{1}{3 + \frac{1}{4 + \frac{1}{5}}}}$$

A. $\frac{68}{157}$

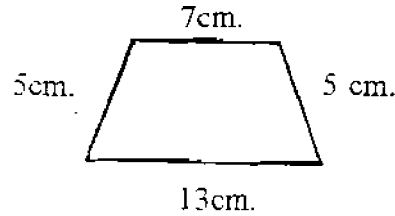
B. $\frac{157}{68}$

C. $\frac{157}{225}$

D. $\frac{225}{157}$

E. none of these

9. Find the area of the isosceles trapezoid.



A. 35 cm^2

B. 40 cm^2

C. 30 cm^2

D. 65 cm^2

E. none of these

10. A gasoline tank is $33\frac{1}{3}\%$ full with 180 gallons of gas. How many gallons are in the tank if it is 50% full?

A. 270

B. 180

C. 540

D. 450

E. none of these

11. $123_4 + 567_8 = \text{---}_9$

A. 700

B. 402

C. 846

D. 486

E. none of these

12. If the net resistance R in a circuit is given by

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$$

then find R_2 if $R_1 = \frac{4}{3}$ and $R = \frac{1}{2}$.

A. $\frac{4}{5}$

B. $\frac{5}{4}$

C. $\frac{2}{3}$

D. $\frac{3}{2}$

E. none of these

13. 40% of 160% of 20 is:

- A. 8 B. $\frac{64}{5}$ C. 24 D. $\frac{32}{5}$ E. none of these

14. Find the sum of the first 100 positive integers.

- A. 10000 B. 10100 C. 5000 D. 5050 E. none of these

15. The two figures shown below are similar.



(NOT DRAWN TO SCALE)

If the area of the smaller one is 9 and the area of the larger one is 36, find the ratio of their perimeters (large to small)

- A. 4 : 1 B. 1 : 4 C. 2 : 1 D. 1 : 2 E. none of these

16. If $f(x) = \frac{2x^3 - 6x + 3}{9x^2 + 10}$, find $f\left(-\frac{1}{2}\right)$.

- A. $\frac{27}{49}$ B. $-\frac{27}{49}$ C. $\frac{23}{49}$ D. $-\frac{23}{49}$ E. none of these

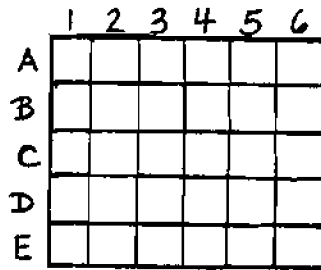
17. Beth's scores on the first four history tests this grading period are 84, 73, 71, and 86. There are three tests left in this period. What will she need to average on those last three tests in order to have a grading period test average of 80?

- A. 82 B. 80 C. 84 D. 79 E. none of these

18. $\frac{\sqrt{1} \cdot \sqrt{4} \cdot \sqrt{9} \cdot \sqrt{16} \cdot \sqrt{25} \cdot \sqrt{36} \cdot \sqrt{49}}{5!} = (?)$

- A. 42 B. $\sqrt{2}$ C. 18 D. $\frac{7}{5}$ E. none of these

19. A room has 30 desks, arranged in 6 rows of 5 desks each. Each desk is 4 feet by 4 feet and there are no walkways. Someone sitting in the middle of desk C1 is how far away from someone sitting in the middle of desk D4?



- A. $\sqrt{10}$ ft B. 6 ft C. $4\sqrt{10}$ ft D. 4 ft E. none of these

20. An elk walks 74 ft due west, 92 ft due north, and 143 ft due east. How far is she from her original starting point?

- A. 115 B. 120 C. 125 D. 130 E. none of these

21. Elizabeth could not stop talking. She talked constantly for 108000 seconds. How many days did she continually talk?

- A. 0.75 days B. 1 day C. 1.25 days D. 1.5 days E. none of these

22. To calculate a baseball player's batting average, a player divides his number of hits by his number of times at bat. After 24 bats, Joe's batting average is .375. Joe only gets one hit out of his next six times at bat. What is his new batting average?

- A. .333 B. .375 C. .250 D. .300 E. none of these

23. The measure of the angles of a triangle are in the ratio 4 : 7 : 9. Find the measure of the largest angle.

- A. 36° B. 63° C. 81° D. 9° E. none of these

24. Find the mean of 101.5, 81.6, 92.7, 103.4, 100.0, 105.5, 100.0, 110.2

- A. 99.2 B. 99.6 C. 100.0 D. 100.75 E. none of these

25. $1^2 + 2^3 + 3^4 + 4^5 = (?)$

A. 1114

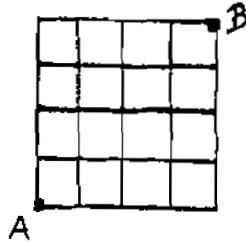
B. 1118

C. 1122

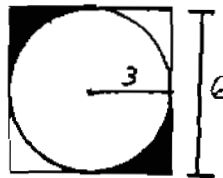
D. 1126

E. none of these

TIEBREAKER 1 How many ways can Miles go from point A to point B by traveling only north and east?



TIEBREAKER 2 What is the area of the shaded region?



TIEBREAKER 3 It takes 3 hours for Duane to do a job alone. It takes 4 hours for Ruth to do the same job alone. How long will it take them working together to complete the job?