Southwest Texas State University
Primary Mathematics World Contest (PMWC)
Qualifying Test

COVER SHEET

Name: ______________________________________________

Street Address:________________________________________

City: ______________________ State: ______ Zip: _________

Phone: ( _____) ______________________

School: __________________________________________

Teacher: ______________________________________________

Present Grade in School:__________

Math Courses Taken:
Pre-Algebra_____Algebra I___ Algebra II ___ Geometry ____

Birthdate (Including year): ______________________________

Social Security Number: _________________________________

Are you a U. S. Citizen? Yes _____ No _____
Directions: This test has 15 problems, with a time limit of 120 minutes. **Show all your work on the test, and how you obtained each answer. Partial credit will be given even if you do not obtain an answer.** Do not worry if you cannot do all the problems. We are more interested in how you approached each problem.

1. A rectangular region is covered by square tiles, each 1 ft X 1 ft. The region is 2 ft. longer than it is wide. Exactly half of the tiles meet the perimeter of the region. What is the area of the region?

   Answer: ________________________

   Work:
2. How many integers between 100 and 999 use exactly 3 different digits? [Example: 7879 uses 3 different digits; 7, 8, and 9]

Answer: ________________________

Work:
3. Sally ran 5 miles in a 1 hour period. For the first 20 minutes, she average 4.5 miles per hour. What was her average speed for the remaining 40 minutes?

Answer: ________________________

Work:
4. Find the sum $1+2-3+4+5-6+\ldots+97+98-99+100+101-102$.

Answer: ________________________

Work:
5. How many squares are there in the diagram? (You must count all 1x1, 2x2, 3x3, and 4x4 squares.)

Answer: ________________________

Work:
6. What is the 100\textsuperscript{th} digit to the right of the decimal place in the decimal expression of \(\frac{1}{74}\)?

Answer: ________________________

Work:
7. Find the sum of $\frac{1}{2!} + \frac{2}{3!} + \cdots + \frac{7}{8!}$.

Answer: ________________

Work:
8. A bag contains 20 marbles. 5 are red, 5 are blue, 5 are green and 5 are yellow. 4 marbles are selected from the bag at random. What is the probability that at least two of the balls will be the same color?

Answer: ________________________

Work:
9. What is the sum of all the 3 digit numbers between 100 and 999 whose digits are odd?.

Answer: ________________________

Work:
10. How many scoring sequences are possible if the Haws won their soccer game with a score of 5 to 4 and were never behind in the game.

Answer: ________________________

Work:
11. In regular octagon ABCDEFGH, what fraction of the total area lies in the cross formed by rectangles ABEF and CDGH?

Answer: ________________________

Work:
12. In rectangle ABCD, diagonal BD intersects AE and at G and H respectively. If CE:EF:FB=1:2:3 and the area of ABCD is 132, what is the area of $\triangle EGH$?

Answer: ________________________

Work:
13. In triangle ABC points D, E, and F lie on AB, BC, and AC respectively so that \( AD:BD=1:2 \), \( BE:EC=1:3 \), and \( CF:FA=1:4 \). Find what fraction of the area of triangle ABC lies in triangle DEF.

Answer: ________________________

Work:
14. In triangle ABC, AB=AC=1. D is a point on AC so that AD=DB=BC=x. Find x.

Answer: ________________________

Work:
15. In triangle ABC, AB=AC. Points D and E lie on AC. (D between A and E), and F lies on AB so that AD=DF=FE=EB=BC. Find the measure of angle BAC.

Answer: ________________________

Work:
16. Sometime between 10 pm and midnight, the hands on a clock interchange positions. What is the original time?

Answer: ________________________

Work:
17. A grocer mixes two kinds of tea - one at 32c a pound and the other at 40c a pound. He plans to sell the mixture at 43c a pound making profit of 25% at the cost. How many pounds of each tea should he use to make a 100 pounds?

Answer: ________________________

Work: