Name: _____   School: _____

8-6-24 Delta Contest

Sample Test 2

Correct answers are worth 1 point. Incorrect and blank answers are worth 0 points. You are given 30 minutes to complete the test and no calculators are allowed.
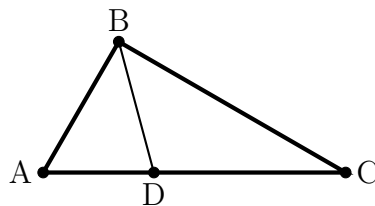
1. _____ $\lfloor x \rfloor$ denotes the greatest integer less than x, for all real numbers x. For example, $\lfloor 5.4 \rfloor = 5$. Compute

$$\lfloor \sqrt{1} \rfloor + \lfloor \sqrt{2} \rfloor + \lfloor \sqrt{3} \rfloor + \lfloor \sqrt{4} \rfloor + \lfloor \sqrt{5} \rfloor + \lfloor \sqrt{6} \rfloor + \lfloor \sqrt{7} \rfloor + \lfloor \sqrt{8} \rfloor + \lfloor \sqrt{9} \rfloor$$

2. _____ How many positive divisors does $2^3 \cdot 3^4$ have?

3. _____ What is the sum of the positive divisors of $2^3 \cdot 3^4$

4. _____ ABC is a right triangle with $AB = 2$, $BC = 2\sqrt{3}$, and $AC = 4$. If BD is the angle bisector of $\angle ABC$, what are the lengths of AD and DC?

5. _____ Kevin wants to buy 7 new shirts. At the department store, they have 3 colors to chose from: blue, pink, and gray. How many ways are there for Kevin to choose the colors for his 7 shirts?

6. _____ Joseph created a new money system. The only coins are 3-cent coins and 7 cent-coins. What is the largest number of cents Joseph cannot create with his money system?