

3rd Annual

Math Invitational

4Girls

Saturday, April 22, 2017

Sponsored By



Team Name: _____

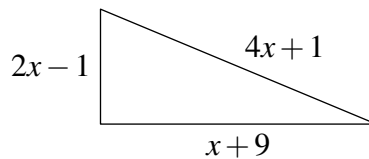
Team Members: _____

1. _____ Point P has coordinate value $(3,2)$, and point Q has coordinate value $(6,x)$. For what value of x does Line PQ have a slope of 6?

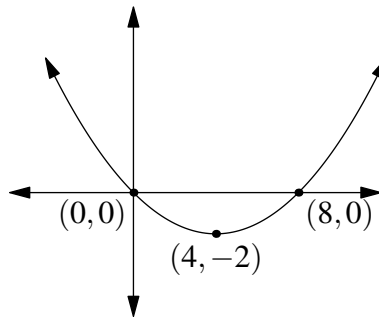
2. _____ I have fewer than one hundred pens. When my pens are grouped into nines, I have one pen left over. When grouped into fives, I have three left over. When grouped into pairs, I have one left over. How many do I have?

3. _____ How many unique rearrangements of the word “COMBO” exist?

4. _____ A right triangle has sides of length $4x + 1$, $2x - 1$, and $x + 9$, where x is a positive integer, and the side of length $4x + 1$ is the hypotenuse. What is the area of the triangle?



5. _____ A parabola has vertex $(4,-2)$ and roots $(8,0)$ and $(0,0)$. What is the coefficient of the linear term when the equation of the parabola is expanded?



6. _____ The terms $2x - 1$, $x + 4$, $4x + 1$ form an arithmetic sequence while the terms x , $x + 4$, xy^2 form a geometric sequence. Evaluate $x + y$.

$$\begin{array}{ccc} 2x - 1 & , & x + 4 & , & 4x + 1 \\ x & , & x + 4 & , & xy^2 \end{array}$$

7. _____ A sphere is inscribed inside a cube that is inscribed inside another sphere. The larger sphere has volume 972π . Calculate the volume of the space inside the larger sphere but outside the smaller sphere. Express your answer in simplest radical form and in terms of π .

8. _____ A computer battery loses 50% of its remaining power every hour. Assuming the computer begins at full battery, how long will it take for the computer to reach 10% battery? Express your answer in minutes and round your answer to the nearest hundredth.

9. _____ How many two-digit numbers have six factors?

10. _____ Thomas is graduating. He decides to attend a college that offers him a sizable scholarship. The number of dollar he receives is an eight digit number using the digits 0 through 7 without repetition and follows the following criteria:

- The number is divisible by 5.
- The last four digits are prime numbers.
- A three digit number comprised of the last three digits in order is divisible by 11.
- A four digit number comprised of the first four digits in order is divisible by 205.

How much money is Thomas receiving in scholarship?

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