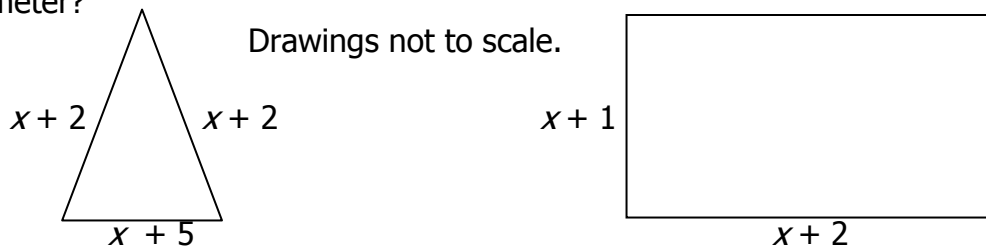


**2009 Middle School Math Festival****Team Round: PreAlgebra**

1. Calculate  $LM$  where  $L = \frac{(-4)^3 - 4^2}{-2^2 + (-3)^2}$  and  $M = -17 - (2)(-6) + 12$ .

2. Rene's pool currently has 70 inches of water in it. He can pump 7 inches of water out of the pool every hour. Let  $N$  = the number of hours it takes until the pool has 14 inches of water in it. Alicia rode her bike seven miles less than three times the distance Spencer rode his bike. If Alicia rode her bike 17 miles, let  $P$  = the number of miles Spencer rode. Calculate  $N - P$ .

3. If the perimeters of the isosceles triangle and rectangle shown below are equal, what is the perimeter?



4. Calculate  $(1.34 \times 10^{-2}) \div (8.0 \times 10^{-3})$ . Write the answer as a decimal.

5. A cube measures 21 feet on a side. A cylinder has a base diameter of 30 feet and a height of 40 feet. What is the positive difference between the volume of the cube and the volume of the cylinder? Use  $\pi = 3.14$ .

6. Solve for  $x$  and  $y$ .  $6(x + 8) = 5(x - 4)$   
 $2(y + 4) = 8 - 6(y - 4)$ . Calculate  $xy$ .

$$A = 2\frac{1}{5} \div 5\frac{1}{2}$$

7. Calculate  $A + B$ . Write the answer as a mixed number, in lowest terms.

$$B = 7\frac{1}{2} \times 9\frac{1}{2}$$

8. A jar contains 3 blue marbles, 4 red marbles, and 5 green marbles. You reach in to the jar and randomly pick out 3 marbles. What is the probability that all three marbles are red?

Team Round (2009): PreAlgebra

9. Calculate  $\frac{\text{Mode} - \text{Range}}{\text{Mean} - \text{Median}}$  for the following data: {15, 31, 20, 26, 20, 32}.

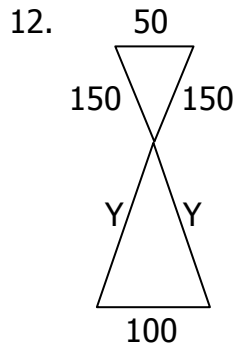
10. Calculate  $E + F$ .

$E =$  the next term in the arithmetic sequence  $1\frac{4}{5}, 1.4, 1, \dots$

$F =$  the next term in the geometric sequence  $3, -\frac{9}{2}, 6\frac{3}{4}, \dots$

Write the answer as a mixed number, in lowest terms.

11. Calculate  $\frac{A}{B}$ . Write the answer as a common fraction.  $A = \text{GCF of } 72 \text{ and } 120$   
 $B = \text{LCM of } 6, 10, 21$



For the figure, the two isosceles triangles are similar. Solve for Y.

A 25-foot tall tree casts a 40-foot shadow. At the same time, another tree casts a 30-foot shadow. Let  $Z =$  the height of the second tree, measured in feet.

Calculate the ratio of  $Y/Z$ .

13. A car normally sells for \$21,000. A dealer has a car sale with a 15% discount. There is a  $7\frac{1}{4}\%$  sales tax. How much will the person pay if he buys the car today? Round to the nearest hundredth

14. Calculate  $m + b$ , where  $m =$  the slope and  $b =$  the  $y$ -intercept of the equation:  $3x - 4y = -7$ . Write the answer as a common fraction, in lowest terms.

$$C = 3\frac{1}{4} - \left(\frac{3}{-4}\right)$$

15. Calculate  $C \div D$ . Write as a common fraction in lowest terms.

$$D = 4\frac{9}{10} + 1\frac{1}{10}$$