Bergen County Math League
Calculators Permitted

Contest #5 **2023-2024** **Answers/Solutions**

5-1. **Answer:** \$17 million

$2 = \left(\frac{1}{3}\right)\left(\frac{6}{13}\right)\left(\frac{13}{17}\right)x = \frac{2}{17}x$, so $x = 17$.

5-2. **Answer:** $\frac{18}{5}$, or $3\frac{3}{5}$, or 3.6

The first train completes $\frac{1}{6}$ of the distance between the towns each hour, and the second train completes $\frac{1}{9}$ of the distance each hour. When they pass each other, they will have collectively travelled the full distance between the towns.

$\frac{1}{6}x + \frac{1}{9}x = 1 \Rightarrow x = \frac{18}{5}$.

5-3. **Answer:** \$5

If x is the cost of the ball, then $x + (x + 2.5) = 12.5$, so $2x = 10$ and $x = 5$.

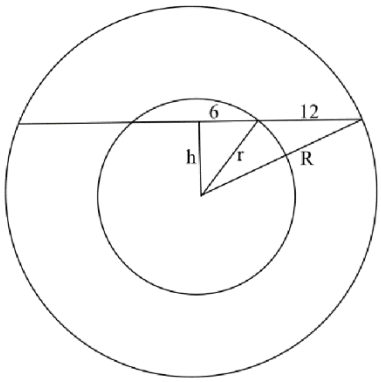
5-4. **Answer:** $(30, 80)$

$Bullets\ win$: $3X - Y = 10$

$\Rightarrow$ Solving, $(X, Y) = (30, 80)$

$Bullets\ lose$: $-X + 1/2\ Y = 10$

5-5. **Answer:** 22



As shown, we have $h^2 = r^2 - 6^2$, and $h^2 = R^2 - 18^2$. Setting these equations equal to each other and substituting $r = 36 - R$ gives $(36 - R)^2 = R^2 - 288$. Expand the left side and solve for R.

5-6. **Answer:** 11

Since $ab_5 = ba_3, 5a + b = 3b + a$ or $2a = b$. Since each digit can only be 0, 1, or 2, we must have $b = 2, a = 1$, and $12_5 = 21_3 = 7_{10} = 11_6$