

University of North Georgia
Sophomore Level Mathematics Tournament
April 11, 2015

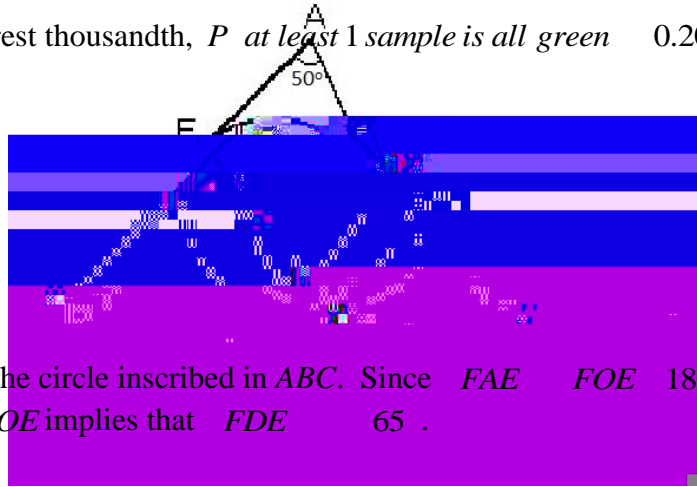
Solutions for the Afternoon Team Competition

Round 1

If you give 1 cookie to the first friend, 2 cookies to the second friend, etc., after 19 friends you have 190 cookies.

So, rounded to the nearest thousandth, P at least 1 sample is all green = 0.200.

Round 4



Let O be the center of the circle inscribed in ABC . Since $\angle FAE = \angle FOE = 180^\circ$, then $\angle FOE = 130^\circ$. Also, $2 \angle FDE = \angle FOE$ implies that $\angle FDE = 65^\circ$.

Round 5

For the first line: $y = 3x + 0$, so $y = 3x$ and $m_1 = 3$.

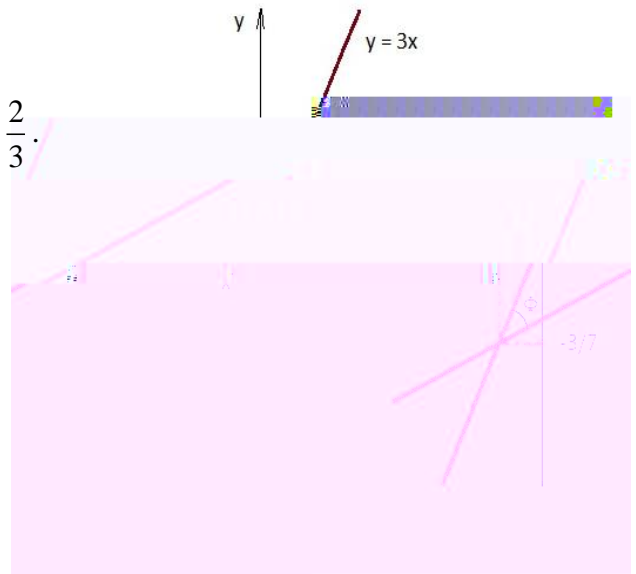
For the second line: $2x + 3y = 1$, so $y = -\frac{2}{3}x + \frac{1}{3}$ and $m_2 = -\frac{2}{3}$.

Using the difference formula for tangent, we have

$$\tan \theta = \left| \frac{m_1 - m_2}{1 + m_1 m_2} \right| = \left| \frac{\frac{2}{3} - 3}{1 + 3 \cdot \frac{2}{3}} \right| = \left| \frac{\frac{7}{3}}{3} \right|.$$

So $\tan \theta = \frac{7}{9}$, then $\theta = \tan^{-1} \frac{7}{9} = 37.87^\circ$.

Rounded to the nearest whole degree = 38



Round 6

The equation of the line through $(a, 0)$ and $(0, b)$

Hence $A = \frac{1}{100}$.

Round 10

Since $ABCDE = 25000$ either $A = 1$ or $A = 2$ and $B = 1, 2, \text{ or } 4$.

Since $EDCBA$ is also even