Round 4

A) Subtracting 1 from both sides of the equation, $2 = \dfrac{2}{1} = \dfrac{2}{3 + \dfrac{1}{x}}$

Since the numerators are equal, we can equate the denominators.

$1 = 3 + \dfrac{1}{x} \rightarrow \dfrac{1}{x} = -2 \rightarrow x = \underline{-\dfrac{1}{2}}$

B) Let $5x$ denote the number of additional questions. Then

$\dfrac{24 + 2x}{75 + 5x} = 35\% = \dfrac{7}{20} \rightarrow 480 + 40x = 525 + 35x \rightarrow x = 9 \rightarrow$ # questions $= 75 + 5(9) = \underline{\mathbf{120}}$

C) $y = \dfrac{2x - 1}{5} \rightarrow 10 < x + \dfrac{2x - 1}{5} < 20 \rightarrow 50 < 7x - 1 < 100 \rightarrow 7.285^{\cdots} < x < 14.428^{\cdots}$

$\rightarrow x = 8, 9, \ldots 14$

Substituting, $x = 8$ immediately gives an integer result.

Since the first equation represents a line with a slope of 2/5, incrementing x by 5 gives the next x for which y is also an integer. Thus, **(8, 3) and (13, 5)**