#223, pg. 184
Difficulty Level: 600-700
Topics: FDPs & Ratios

30 Seconds Hack

X is 40% ryegrass, Y is 25% ryegrass, but the mixture is only 30% ryegrass. We can conclude that because the overall mixture is much closer to Y in its concentration of ryegrass, this mixture is mostly Y and contains only a little X. Cross off D and E, and possibly C

Guess A or B, or possibly C

Solution A - Intuitive Solution

If the amounts of X and Y were equal in the mixture, the overall concentration of ryegrass would have been right in the middle of X and Y's concentrations of ryegrass. Because the concentration of ryegrass in the mix (30%) is twice as close to its concentration in Y (25%, 5 away) as it is to its concentration in X (40%, 10 away), we can conclude that there is twice as much Y in the mixture as there is X.

The mixture is 1 part X, and 2 parts Y. So X makes up a third, or $33\frac{1}{3}$ percent of the whole mixture.

Note: Whatever else X and Y may contain is irrelevant because it is only what they have in common that allows us to find out their relative quantity once they are mixed.

The correct answer is B

Solution B

The formula that would allow us to find the concentration of ryegrass in a mixture of X and Y is: $\frac{\text{total quantity of rye}}{\text{total quantity of mix}}$.

The total quantity of ryegrass is the ryegrass in X (40% of X) plus the ryegrass in Y (25% of Y). The total quantity of the mix is all of X plus all of Y. Finally, we are told that the concentration of ryegrass in the mixture is 30%. So we can build the equation below:

Concentration of rye in mixture is 30% → $\frac{0.4X + 0.25Y}{X + Y} = 0.3$

Cross Multiply → $0.4X + 0.25Y = 0.3X + 0.3Y$

Isolate variables → $0.1X = 0.05Y$

Multiply by 20 to eliminate decimals → $2X = Y \rightarrow X = \frac{1}{2}Y$

If X is ½ of Y, the mixture must be 1 part X, and 2 parts Y. So X makes up a third, or $33\frac{1}{3}$ percent of the whole mixture

The correct answer is B