MATHCOUNTS 2015–2016 HB Poster Problem

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Allie passes a flag every six seconds, and **Alex** passes a flag every five seconds. We can write equations for each of their distances since distance = rate × time. **Alex's** distance will be $\frac{1}{5} \times t$, where t represents the time in seconds from when **Alex** starts skiing and the distance is measured in the number of flags passed. **Allie's** distance will be $\frac{1}{6} \times (t + 6)$, since she has a 6 second head start on **Alex**. To find when **Alex** will reach **Allie**, we can set the two expressions to be equal and solve for t.

$$\left(\frac{1 \text{ flag}}{5 \text{ seconds}}\right) \times t \text{ seconds} = \left(\frac{1 \text{ flag}}{6 \text{ seconds}}\right) \times (t + 6) \text{ seconds}$$

$$\frac{t}{5} = \frac{t+6}{6}$$

$$\frac{1}{5}t = \frac{1}{6}t + 1$$

$$\left(\frac{1}{5} - \frac{1}{6}\right)t = 1$$

$$\frac{1}{30}t = 1$$

$$t = 30$$

Alex will reach **Allie** after **30** seconds.

Another way to solve this problem is to use a table to show distance verses time. Measuring time from when **Alex** starts skiing, we can fill in the following table.

Distance (Flags)	**Allie's** Time (Seconds)	**Alex's** Time (Seconds)
1	0	5
2	6	10
3	12	15
4	18	20
5	24	25
6	30	30

We see that **Allie** and **Alex** will both be at flag number six at **30** seconds.