Problem 1. After robbing a bank in Dodge City, Kansas, a robber rides off at a rate of 14 mi/hr. We aren't exactly sure what the robber is riding. Standard-bred horses can run faster than 30 miles per hour, and the robber is going at a much slower rate; are there llamas in Kansas? Ten minutes later, the Marshal is woken up from a nap and leaves to pursue him at a rate of 16 mi/h. Likewise, we haven't the slightest clue as to what the Marshal is riding. How long does it take the Marshal to catch up, assuming the llamas don't get tired, with the robber? (10 points.)

Solution 1. After t hours, the robber will be $14t$ miles away from his initial location. Since the Marshal left 10 minutes ($=\frac{1}{6}$ hours) after the robber left, he will be $16(t-\frac{1}{6})$ miles away from his initial location. Since the Marshal has to be in "the same spot" as the robber to catch him, we set the two equal to each other:

$$14t = 16\left(t - \frac{1}{6}\right).$$

Solving the equation, we get $t = \frac{4}{3}$ hours—or 80 minutes.

Solution 2. We construct a table:

	Robber	Marshall
Rate	14	16
Time	t	$t-\frac{1}{6}$
Distance	$14t$	$16(t-\frac{1}{6})$

The distances have to be equal, hence

$$14t = 16\left(t - \frac{1}{6}\right).$$

Solving the equation, we get $t = \frac{4}{3}$ hours—or 80 minutes.