

Application: Physical Education

At a local high school, girls' softball and boys' baseball games were going on at the same time. The baseball pitcher was throwing 90 mph from 60 feet, while the softball pitcher was throwing 60 mph from 40 feet. An observer argued that the reaction time for the batters in the softball game was less than for the batters in the baseball game, despite the difference in speed and distance. Was this observer correct?

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Answer: The batter's reaction time is equal to the amount of time it takes for the ball to travel to the plate from the moment it is released from the hand of the pitcher.

In the softball case, using proportional reasoning, the ball is traveling 60 mph for 40 feet. How long does that take?

$$\frac{60 \text{ miles}}{1 \text{ hour}} \text{ times } \frac{1 \text{ hour}}{60 \text{ minutes}} \text{ times } \frac{1 \text{ minute}}{60 \text{ seconds}} \text{ times } \frac{5280 \text{ feet}}{1 \text{ mile}} \text{ equals } \frac{88 \text{ feet}}{1 \text{ second}}$$

Thus, 60 mph equals 88 feet per second.

If the softball is moving at 88 feet per second, how long does it take to travel 40 feet?

$$\frac{88 \text{ feet}}{1 \text{ second}} \text{ equals } \frac{40 \text{ feet}}{x \text{ seconds}}$$

$$x = 40/88 \text{ or } 0.454545\dots \text{ seconds.}$$

So the reaction time for the softball is 0.45 seconds.

Similar calculations show that the baseball traveling at 90 mph is traveling at 132 feet per second. So how long does it take to travel 60 feet?

$$\frac{132 \text{ feet}}{1 \text{ second}} \text{ equals } \frac{60 \text{ feet}}{x \text{ seconds}}$$

$$x = 60/132 \text{ or } 0.454545\dots \text{ seconds.}$$

The reaction time for the baseball batter and the softball batter is exactly the same and that answers the question!