

## NUMB3RS Activity: Baseball Math

Episode: Hardball

In "Hardball", an amateur mathematician uncovers an equation that identifies steroid abuse in baseball.

This type of math is called sabmetrics, which Charlie calls "a powerful form of analysis in baseball."

Which sabmetrics is not an exact science, many major league baseball teams use it when evaluating players and making decisions about team needs and offensive strategies.

**1.** The Pythagorean expectation (shown below) is a sabmetric formula used to estimate how many games a team should win ( $W$ ) based on the number of runs scored ( $S$ ) and the number if runs allowed ( $A$ ).

$$W = \frac{S^2}{S^2 + A^2}$$

**a.** In the 2006 regular season, the Detroit Tigers scored 822 runs and allowed 675. Determine their expected winning percentage.

$S =$  \_\_\_\_\_

$A =$  \_\_\_\_\_

**b.** In the 2004 regular season, the Boston Red Sox scored 768 runs and allowed 949. Determine their expected winning percentage.

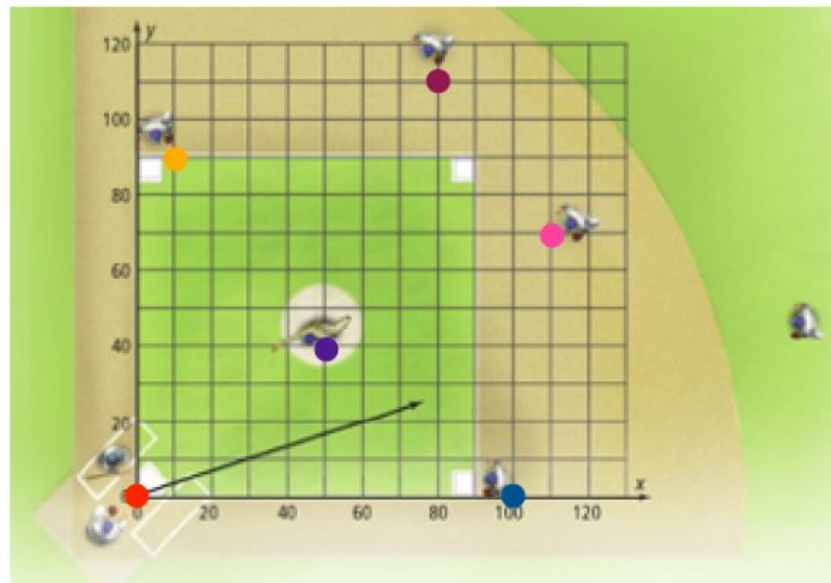
$S =$  \_\_\_\_\_

$A =$  \_\_\_\_\_

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2. Use the picture below to answer the following questions



a. Determine the location of each player

Pitcher ●

Second Base ●

Catcher ●

First Base ●

Third Base ●

Outfield ●

b. Find the slope of the baseball's path.

Rise = \_\_\_\_\_

Run = \_\_\_\_\_

$$m = \frac{\text{rise}}{\text{run}}$$

$$m = \text{---}$$

$$m = \text{---}$$

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3. You can use the formula  $a = \frac{h}{n}$  to find the batting average ( $a$ ) of a batter who has  $h$  hits in  $n$  times at bat.

a. Solve the formula for  $h$

$$a = \frac{h}{n}$$

b. If a batter has a batting average of .290 and has been at bat 300 times, how many hits does the batter have?

Hint: use your formula from part a.

c. Solve the formula for  $n$

$$a = \frac{h}{n}$$

d. If a batter has a batting average of .350 and has 175 hits, how many times has the batter been at bat?

Hint: use your formula from part c.