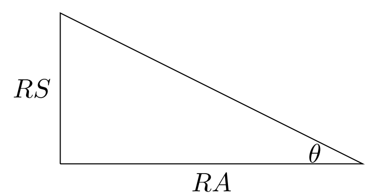
Moneyball Analytics

The Pythagorean expectation from the chapter says

$$P = \frac{RS^2}{RS^2 + RA^2}$$

where RS is runs scored, RA is runs allowed, and P is the percent of games the team is expected to have won. While the book says that the Pythagorean expectation is loosely connected to the Pythagorean Theorem, $a^2 + b^2 = c^2$, P is more closely aligned to trig functions and could be considered the $\sin^2(\theta)$ of the following triangle:



Worksheet: Compute Like Bill James

Test James' Pythagorean expectation for another team. Pick a year and a Major League Baseball Team. Everyone gets a unique team/year.

1. Find *runs scored* by your team (RS): ____________
2. Find *runs allowed* by your team (RA): ____________
3. Compute $P = \frac{RS^2}{RS^2+RA^2}$: ____________
4. Compute $P \times 162$: ____________

The result in line 4 is an estimate of how many games your team won in the season you chose. How close is it to the actual statistic? (For a year before 1962 or the short 2020 season, substitute the appropriate number of games.

Baseball is a sport filled with statistics, but it is not the only one. Consider a sport other than Baseball that you follow. What statistics similar to *runs for* and *runs against* do you think would be a good substitute in that sport? Try it for one team for one season for your sport.

1. Find statistic S for your team: ____________
2. Find similar statistic for the other team OT: ____________
3. Compute $P = \frac{S^2}{S^2+OT^2}$: ____________
4. Compute $P\times$ games played: ____________

How did you do? Is it as close as for baseball?

Another thing that can be considered is the exponent in the Pythagorean expectation. In a more general world, you could change the exponent from 2 to a [1] and have a formula more like

$$P = \frac{S^a}{S^a + OT^a}$$

Play around with different values of a to see if you can get a better estimate of the percent of games won. What happens to the number as you increase a from 2 to something larger? What would happen if you made a between 0 and 2?

[1] This is taking us from the trigonometry of circles into a new world of the trigonometry of squircles. Come see me if you are curious.