

PART ONE: GOING, GOING

- The left field wall in Boston's Fenway Park – aka the “Green Monster” – is 310 feet from home plate and 37 feet tall. Imagine a right-handed batter hits two balls down the left field line. Ignoring air resistance, the height of each ball can be modeled using the equations below, where x represents the ball's distance from home plate.

Identify the key points along each ball's flight path. Will either ball clear the Green Monster and result in a home run?

	TRAJECTORY, HIT A	TRAJECTORY, HIT B
	$\text{height} = -0.0003(x - 200)^2 + 15$	$\text{height} = -0.004(x - 170)^2 + 119$
HEIGHT AT CONTACT		
MAXIMUM HEIGHT		
DISTANCE @ MAX. HEIGHT		
LANDING DISTANCE		
HOME RUN?		

- In most pro sports, the dimensions of the playing surfaces are always the same. In the NFL, every field is 100 yards long and 160 feet wide. In the NHL, every rink is 200 feet long and 80 feet wide. In Major League Baseball, however, every field is different.

Determine whether the previous trajectories would clear the left-field walls of three other MLB stadiums. If you were a right-handed batter, which team's stadium – the Red Sox, Yankees, Giants, or Cubs – would you rather play in and why?

DISTANCES FROM HOME PLATE AND HEIGHTS, MLB LEFT-FIELD WALLS

NY YANKEES	SF GIANTS	CHICAGO CUBS
318 feet, 8 feet	339 feet, 8 feet	355 feet, 16 feet

PART TWO: TAKE ME OUT TO THE BALL(PARK)

- 3 According to the statistics website Statcast, the average home run (left field) travels a distance of 378 feet and reaches a maximum height of 81 feet. Assuming the ball is struck from 3 feet in the air, write an equation to model the average home run ball's trajectory.
- 4 The following table shows the distance and height of every left field wall in Major League Baseball. Using your home run trajectory equation, determine which stadium is the easiest for home runs and which stadium is the hardest. Do you think this is fair?

DISTANCES FROM HOME PLATE AND HEIGHTS, MLB LEFT-FIELD WALLS								
TEAM	DIST	HGHT	TEAM	DIST	HGHT	TEAM	DIST	HGHT
Angels (LAA)	330'	5'	Giants (SF)	339'	8'	Rangers (TEX)	332'	14'
Astros (HOU)	315'	21'	Guardians (CLE)	325'	19'	Rays (TB)	315'	11'
Athletics (OAK)	330'	8'	Mariners (SEA)	331'	15'	Red Sox (BOS)	310'	37'
Blue Jays (TOR)	328'	8'	Marlins (MIA)	344'	7'	Reds (CIN)	328'	12'
Braves (ATL)	335'	6'	Mets (NYM)	335'	8'	Rockies (COL)	347'	8'
Brewers (MIL)	344'	8'	Nationals (WAS)	336'	9'	Royals (KC)	330'	9'
Cardinals (STL)	336'	8'	Orioles (BAL)	333'	7'	Tigers (DET)	345'	7'
Cubs (CHC)	355'	16'	Padres (SD)	334'	4'	Twins (MIN)	339'	8'
Diamondbacks (ARI)	330'	8'	Phillies (PHI)	329'	11'	White Sox (CWS)	335'	8'
Dodgers (LAD)	330'	4'	Pirates (PIT)	325'	6'	Yankees (NYY)	318'	8'

- 5 Many people wonder why baseball fields vary so much by stadium. Watch the video about the history of MLB stadiums. Do you think the dimensions of baseball fields should be standardized, or do you think it's okay for every stadium to be unique? Explain.