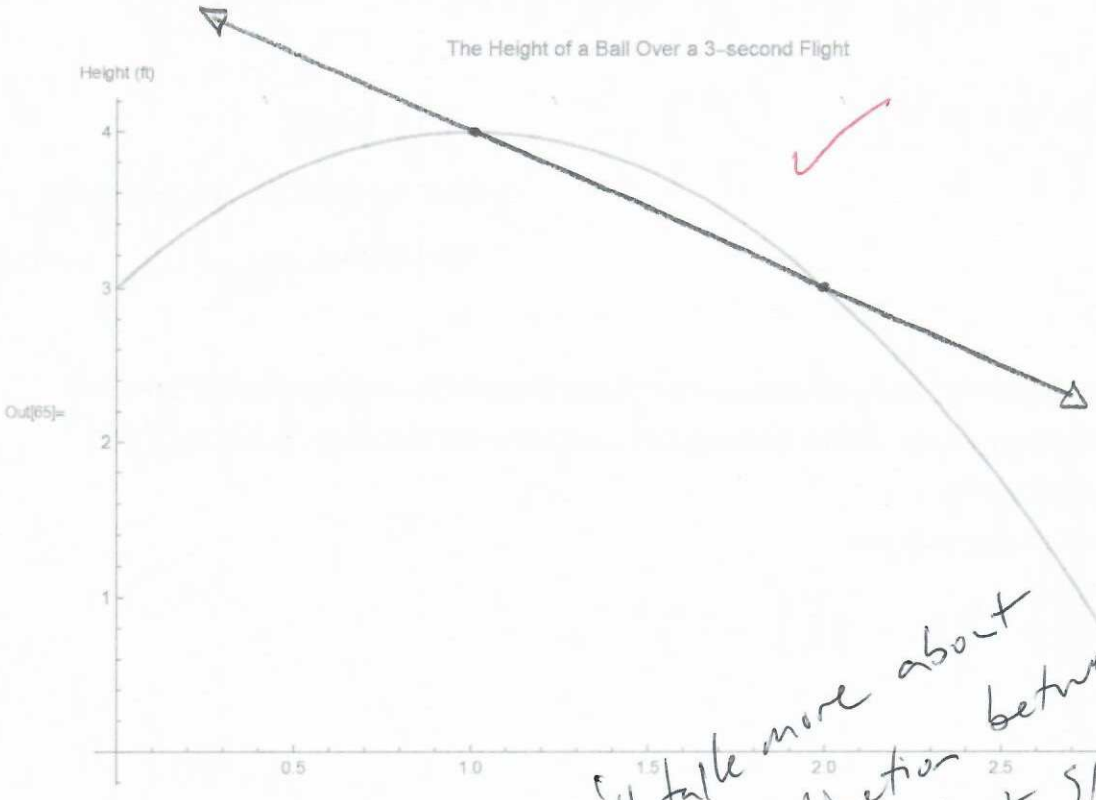
Consider the following function:

$h(t)=4-(t-1)^2$

representing the flight of a ball.




a. Describe the flight

- the flight of the ball is decreasing in velocity in the positive direction from 0 to 1 seconds.
- at 1 second, it has a velocity of 0 ft/s.
- the flight of the ball is increasing in velocity in the negative direction from 1 to 3 seconds, stoping at 3 seconds.

We'll talk more about the distinction between velocity & speed! The sign of velocity tells you the direction.

Good

speed

speed

b. Compute the ball's average velocity over this period, from t=1 to t=2. How does this average velocity compare to the ball's instantaneous velocity at t=1 (you do not need to compute the instantaneous velocity, although you might be able to estimate it....)?

1, 4
2, 3

$h(2) = 3$

$h(1) = 4$

$av = \frac{y_1 - y_2}{x_1 - x_2}$

$= \frac{3 - 4}{2 - 1}$

$= -1 \text{ ft/s}$ ✓

Since the peak is at $t = 1$, the instantaneous velocity should be $= 0$. The AV and IV are slightly different ✓

c. **Carefully** draw the secant line connecting the ball's positions at times t=1 and t=2 onto the graph. Write the equation of the secant line in both of the following two forms:

i. point-slope form

$y - 3 = -1(x - 2)$ ✓

$y - 3 = -x - 2$

Well done

ii. slope-intercept form

$4 = -1(1) + b$

$4 = -1 + b$

$b = 5$

$y = mx + b$

$y = -x + 5$ ✓