GSE Algebra I   **Name** _____

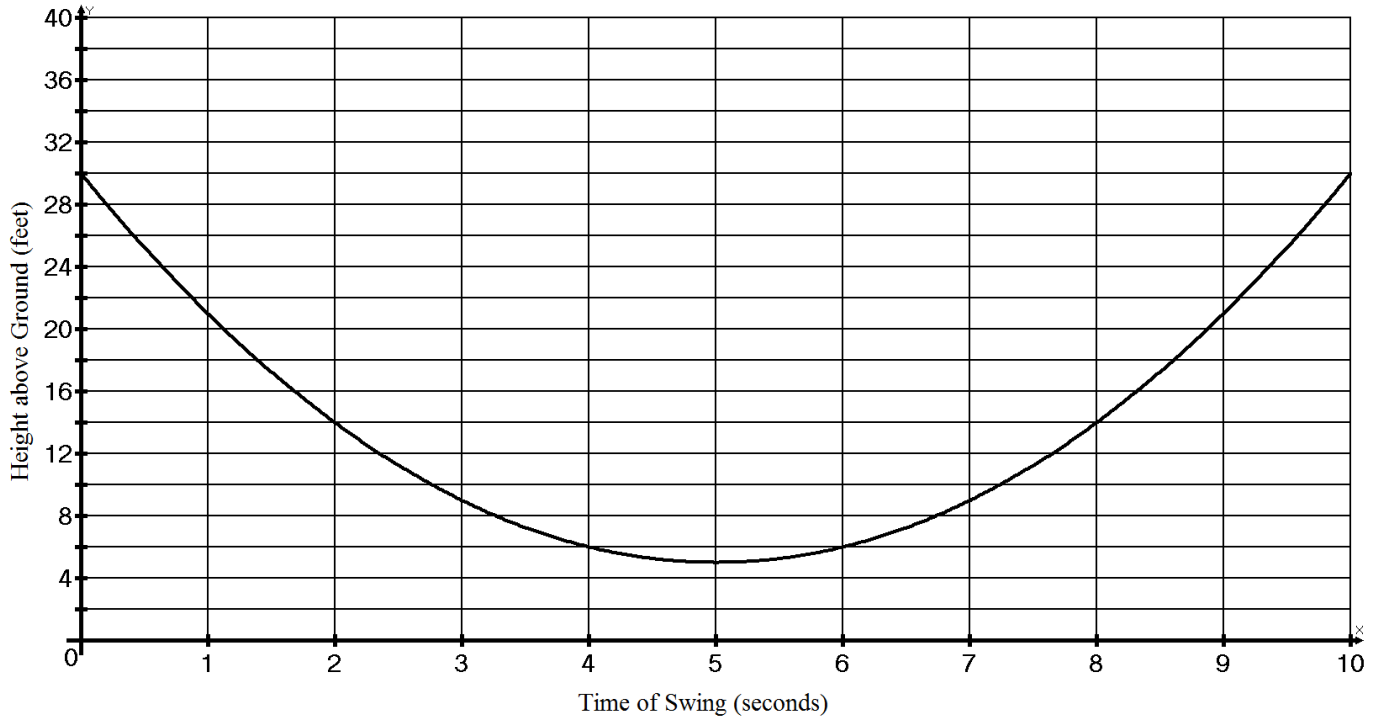**Applications of Quadratics Task**

Jeremiah is having a great time on a ropes course. He has gotten to the last element which is a giant swing. As he swings down, his path is modeled by the equation $h(t) = (t - 5)^2 + 5$ *where t is the time on the swing in seconds and h is his height off the ground in feet. A graph of the function is shown below:*

Time of Swing (seconds)

1. At what height does Jeremiah's swing start?   What point is this on the graph?

2. When does he reach the bottom of his swing and how high is he then?   What point is this on the graph?

3. When is Jeremiah back at the same height he started at?

4. How high is Jeremiah above the ground after 3 seconds of swinging?

5. When is Jeremiah 14 feet above the ground?

6. What is h(8)?   What does this mean in context?

7. If h(t) = 6, what is t?   What does this mean in context?

8. What is the average rate of change for 0 < x < 2?   What is the unit on this answer?

Ashante is shooting off a rocket that she made for the science fair. The path her rocket takes is modeled by the function $h(t) = -5x^2 + 60x$ where t is the time that the rocket is in the air in seconds and h is its height off the ground in meters. A graph of the function is shown below:

Height above Ground (meters) vs. Time of Flight (seconds)
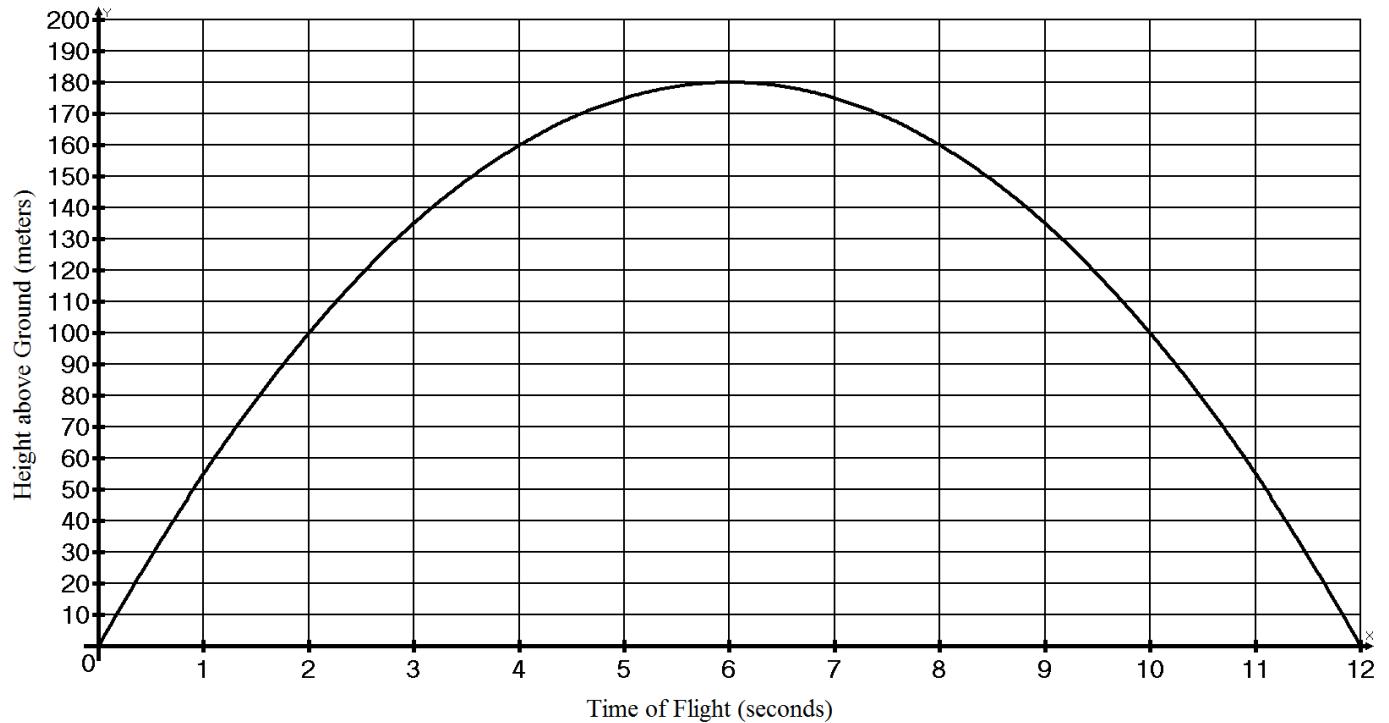
1. At what height does Ashante's rocket start?   What point is this on the graph?

2. When does the rocket reach its peak and how high is it then?   What point is this on the graph?

3. When does the rocket return to the ground?   What point is this on the graph?

4. How high is the rocket above the ground after 7 seconds of flight?

5. When is the rocket 100 feet above the ground?

6. What is h(10)? What does this mean in context?

7. If h(t) = 160, what is t?   What does this mean in context?

8. What is the average rate of change for 0 < x < 2?   What is the unit on this answer?

9. What is the average rate of change for 2 < x < 4? How does this rate of change compare to #8?