Name _____ Period _____ Date:_____

## Graphs Unmasked – Explore Activity

### The Graph Whisperer

Instructions: Solve each problem and provide your answers in the space provided.

**Problem 1:**

A ball is thrown into the air with an initial velocity of 30 meters per second. The height of the ball (in meters) can be modeled by the quadratic function $h(t) = -5t^2 + 30t + 5$, where t represents time in seconds. Determine the maximum height the ball reaches and the time it takes to reach that height.

*h(t)*

*(3,50)*
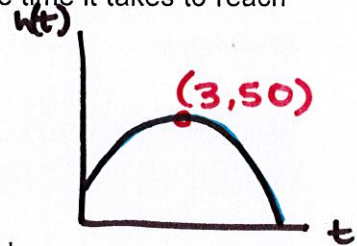
Solution:

Maximum height: ___**50**___ meters after ___**3**___ seconds

**Problem 2: TYPO?**

A farmer is constructing a rectangular pen for his animals. He wants to enclose a total area of 200 square meters using one side of the pen as a barn wall. The width of the pen (in meters) is represented by the quadratic function $w(x) = x^2 - 6x + 8$, where x represents the length of the pen. Determine the dimensions of the pen that will maximize the width.

*w*
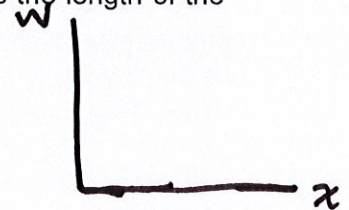
Solution:

Length of the pen: _____ meters,   Width of the pen: _____ meters

**Problem 3:**

A satellite dish is mounted on a wall. The height (in meters) of the satellite dish above the ground as it moves horizontally along a wall is given by the quadratic function $h(x) = -0.1x^2 + 5x + 2$, where $x$ represents the horizontal distance from the starting point. Determine the height of the satellite dish when it is 10 meters away from the starting point.

*h(x)*
*100*
*(10,42)*
*60*
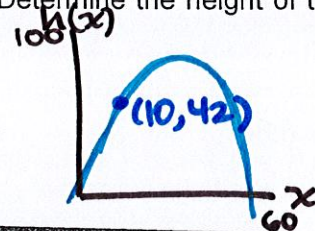
Solution:

Height of the satellite dish: ___**42**___ meters

**Problem 4:**

A model rocket is launched from the ground with an initial velocity of 40 meters per second. The height of the rocket (in meters) above the ground after $t$ seconds is given by the function $h(t) = -5t^2 + 40t$. Determine the time it takes for the rocket to reach the ground after being launched.

**Solution:**

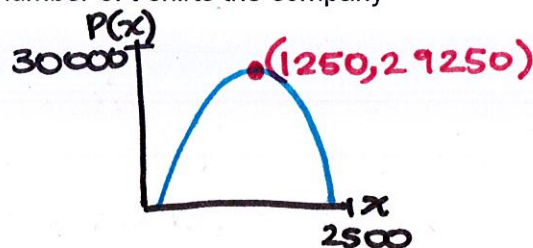Time for the rocket to reach the ground: ___**8**___ seconds
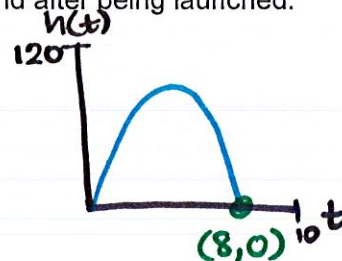
**Problem 5:**

A company sells t-shirts online. The profit (in dollars) made by selling $x$ t-shirts is given by the quadratic function $P(x) = -0.02x^2 + 50x - 2000$. Determine the number of t-shirts the company needs to sell to maximize their profit.

**Solution:**

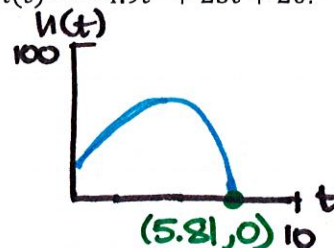Number of t-shirts to maximize profit: ___**1250**___

**Problem 6:**

A ball is thrown off a cliff with an initial velocity of 25 meters per second. The height of the ball (in meters) above the ground after $t$ seconds is given by the function $h(t) = -4.9t^2 + 25t + 20$. Determine the time it takes for the ball to hit the ground.

**Solution:**

Time for the ball to hit the ground: ___**5.81**___ seconds.

**Problem 7:**

A fireworks display is launched into the air from a platform at ground level. The height (in meters) of a firework rocket above the ground after $t$ seconds is given by the quadratic function $h(t) = -2t^2 + 10t + 15$. How long is the firework in the air before it reaches its maximum height? Determine the maximum height reached by the firework.

**Solution:**

Maximum height reached: ___**27.5**___ meters after ___**2.5**___ seconds.