Math 3 **3.7 Standard Form** Unit 3

*SWBAT graph a quadratic equation in standard form and apply this to word problems.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Quadratic Functions** | **Example 1:** | **Example 2:** | **Example 3:** | **Example 4:** |
| **Direction of Opening:** |  |  |  |  |
| **Axis of Symmetry:**    *or the x-value of the vertex* |  |  |  |  |
| **Vertex:**  *Solve by hand or find max/min in the calculator* |  |  |  |  |
| **Y-Intercept:**  (0, c) |  |  |  |  |
| **Domain:**  *x-values of the graph* |  |  |  |  |
| **Range:**  *y-values of the graph* |  |  |  |  |

 Example 1: Example 3:

 Example 2: Example 4:

**Application of Standard Form**

**Example 1:** Find an equation in standard form of the parabola passing through the points (1, -2), (2, -2), (3, -4).

|  |
| --- |
| **Calculator Steps:**  **Step 1:** Hit Stat 🡪 Edit  **Step 2:** Input the x-values into L1 and the  y-values into L2  **Step 3:** Hit Stat🡪Calc🡪5 (QuadReg) |

**Example 2:** Determine whether a quadratic model exists for each set of values. If so, write the model.

f(0)=5, f(2)=3, f(-1)=0

**Example 3:** Determine whether a quadratic model exists for each set of values. If so, write the model.

f(-2)=7, f(0)=1, f(2)=0

**Example 4:** A student standing on the top of the bleachers throws a football across the field. The data that follows gives the height of the ball in feet versus the seconds since the ball was thrown.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Time | 0.2 | 0.6 | 1 | 1.2 | 1.5 | 2 | 2.5 | 2.8 | 3.4 | 3.8 | 4.5 |
| Height | 92 | 110 | 130 | 134 | 142 | 144 | 140 | 132 | 112 | 90 | 44 |

1. Find a quadratic model for the data.
2. Using the model of best fit, predict the height for 4.8 seconds.

**Example 5:** A man throws a ball off the top of a building and records the height of the ball at different times, as shown in the table.

|  |  |
| --- | --- |
| **Time(s)** | **Height** (in feet) |
| 0 | 46 |
| 1 | 53 |
| 2 | 48 |
| 3 | 1 |

1. Find a quadratic model for the data.
2. Use the model to estimate the height of the ball at 2.5 seconds.
3. What is the ball’s maximum height?