

2.4 Modeling Data with Quadratic Functions DAY TWO CYU

Use when you get it right all by yourself  
**S** Use when you did it all by yourself, but made a silly mistake  
**H** Use when you could do it alone with a little help from teacher or peer  
**G** Use when you completed the problem in a group  
**X** Use when a question was attempted but wrong (get help)  
**N** Use when a question was not even attempted

| CONCEPTS                            | BASIC      | INTERMEDIATE | ADVANCED |
|-------------------------------------|------------|--------------|----------|
| Quadratic Model from the calculator | 4 - 6, 10b | 1 - 3        |          |
| Quadratic Model from a graph        |            | 7 - 9        |          |
| Finite Differences                  | 10a        |              |          |
| Prediction                          | 10c        |              |          |
| Domain/Range                        | 10d        |              |          |

Find a quadratic model for each set of values.

1. (-1, 1), (1, 1), (3, 9)

$$y = x^2$$

2. (-4, 8), (-1, 5), (1, 13)

$$y = x^2 + 4x + 8$$

3. (-1, 10), (2, 4), (3, -6)

$$y = -2x^2 + 12$$

4. 

|      |    |    |   |
|------|----|----|---|
| x    | -1 | 0  | 2 |
| f(x) | 1  | -1 | 7 |

$$f(x) = 2x^2 - 1$$

5. 

|      |    |   |    |
|------|----|---|----|
| x    | -4 | 0 | 1  |
| f(x) | 1  | 9 | 16 |

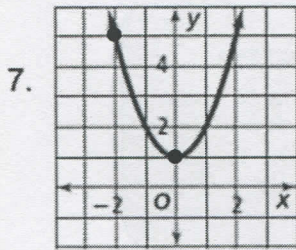
$$f(x) = x^2$$

6. 

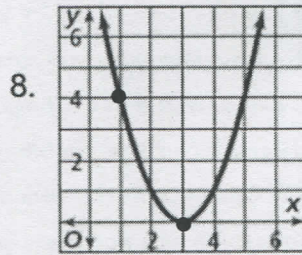
|      |    |   |   |
|------|----|---|---|
| x    | -1 | 2 | 3 |
| f(x) | 12 | 3 | 4 |

$$f(x) = x^2 - 4x + 7$$

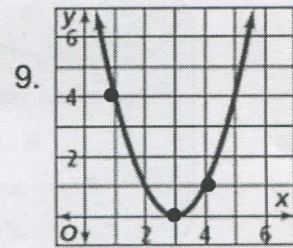
Identify the vertex and the axis of symmetry of each parabola. Then write the equation for the given graph.



V: (0, 1)  
AofS:  $x = 0$   
 $y = x^2 + 1$



V: (3, 0)  
AofS:  $x = 3$   
 $y = x^2 - 6x + 9$



V: (3, 0)  
AofS:  $x = 3$   
 $y = x^2 - 6x + 9$

10. A toy rocket is shown upward from ground level. The table shows the height of the rocket at different times.

|   |                   |   |     |     |     |     |
|---|-------------------|---|-----|-----|-----|-----|
| x | Time (in seconds) | 0 | 1   | 2   | 3   | 4   |
| y | Height (feet)     | 0 | 256 | 480 | 672 | 832 |

256 224 192 160  
-32 -32 -32

- Use finite difference to prove this rocket data is quadratic (degree of two).
- Find a quadratic model for this data using the calculator. Check your data entries!

$y = -16x^2 + 272x$

- Use the model to estimate the height of the rocket after 1.5 seconds.  $x = 1.5$

$f(1.5) = 372$  372 ft

- Describe appropriate domain and range in interval notation.

D:  $[0, 17]$  R:  $[0, 1156]$  Maximum V: (8.5, 1156)

CYU Reflection: How far can you go: basic, intermediate, or advanced?

Rate your mastery level!

How confident are you with the skills this CYU covered? Circle the score you would give yourself.

