

2.4 Modeling Quadratic Functions using Regression CYU DAY FOUR

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 Regression	1, 3, 10 - 13	6, 7	8, 9
Maximum/Minimum	2	6	
Writing a Best Fit Model	1, 3, 10 - 13	6, 7	5, 8, 9
Prediction		4, 7	

Amery recorded the distance and height of a basketball when shooting a free throw.

Distance(feet), x	Height (feet), f(x)
0	4
2	8.4
6	12.1
9	14.2
12	13.2
13	10.5
15	9.8

1. Find the quadratic equation for the relationship of the horizontal distance and the height of the ball. Round to 3 decimal places.

$y = -0.118x^2 + 2.112x + 4.215$

2. Using this function what is the approximate maximum height of the ball? $(8.949, 13.665)$

≈ 13.665 ft

This table shows the population of a city every ten years since 1970.

Years Since 1970, x	Population (In thousands), y
0	489
10	801
20	1,202
30	1,998
40	2,959

3. Find the best-fitting quadratic model for the data. Round to 3 decimal places.

$y = 1.209x^2 + 12.999x + 504.257$

4. Using this model, what will be the estimated population in 2020? $x = 50$

$f(50) = 4176.257 \approx 4176 \text{ thousand}$

5. Which of the following is best modeled by a **quadratic** function?
 A. Relationship between circumference and diameter.
 B. Relationship between area of a square and side length.
 C. Relationship between diagonal of a square and side length.
 D. Relationship between volume of a cube and side length.

6. If y is a quadratic function of x, which value completes the table?

- A. 12
 B. 20
 C. 44
 D. 48

x	-2	0	2	4	6
y	-8	0	12	28	

$f(6) = 48$

$y = \frac{1}{2}x^2 + 5x + 0$

7. The graph of a quadratic function having the form $f(x) = ax^2 + bx + c$ passes through the points $(0, -8)$, $(3, 10)$, and $(6, 34)$. What is the value of the function when $x = -3$? $f(x) = 0.333x^2 + 5x - 8$ $f(-3) \approx -20.003$

A. -32

B. -26

C. -20

D. 10

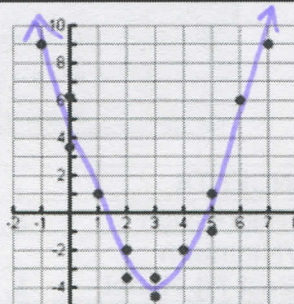
8. Which is the quadratic equation the best fits the scatterplot?

A. $f(x) = (x-3)^2 - 4$ best

~~B. $f(x) = (x+3)^2 + 4$~~

~~C. $f(x) = (x-4)^2 - 3$~~

~~D. $f(x) = (x+4)^2 + 3$~~



9. Which is the quadratic equation the best fits the scatterplot?

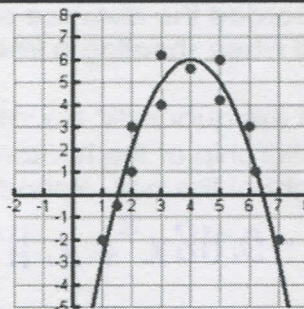
~~A. $f(x) = x^2 - 8x + 22$~~ $\downarrow R_x$

~~B. $f(x) = -x^2 - 8x - 10$~~ $b = +$

~~C. $f(x) = -x^2 + 8x - 32$~~

D. $f(x) = -x^2 + 8x - 10$

x	y
1	-2
1.5	-0.5
2	1
2	3
3	4
3	6.1
4	5.7



x	y
5	6
5	4.2
6	3
6.1	1
7	-2

Write a quadratic equation that fits each set of points.

10. $(0, -8)$, $(2, 0)$, and $(-3, -5)$

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

11. $(-1, -16)$, $(2, 5)$, and $(5, 8)$

$y = -x^2 + 8x - 7$

12. $(1, 4)$, $(-2, 13)$, and $(0, 3)$

$y = 2x^2 - x + 3$

13.

x	-1	0	1	2	3
y	35	22	11	2	-5

$y = 1x^2 - 12x + 22$

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.

