ANSWER PRESENTATION TOOL

Algebra 2 - Student Edit 2 4 - Practice 2-32 ALL EVEN Show Solı

ODD

2. Use the vertex and the point to solve for a in vertex form.

$y = a(x - h)^2 + k$

$3 = a(8 - 4)^2 - 1$

$4 = 16a$

$a = \frac{1}{4}$

So, the equation of the parabola is $y = \frac{1}{4}(x - 4)^2 - 1$.

4. Use the vertex and the point to solve for a in vertex form.

$y = a(x - h)^2 + k$

$-15 = a(-7 + 5)^2 + 9$

$-24 = 4a$

$a = -6$

So, the equation of the parabola is $y = -6(x + 5)^2 + 9$.

6. Use the vertex and the point to solve for a in vertex form.

$y = a(x - h)^2 + k$

$35 = a(6 + 1)^2 + 14$

$21 = 49a$

$a = \frac{3}{7}$

So, the equation of the parabola is $y = \frac{3}{7}(x + 1)^2 + 14$.

8. Use the x-intercepts and the point to solve for a in intercept form.

$$y = a(x - p)(x - q)$$
$$-2 = a(1 - (-1))(1 - 2)$$
$$-2 = -2a$$
$$a = 1$$

So, the equation of the parabola is $y = (x + 1)(x - 2)$.

10. Use the x-intercepts and the point to solve for a in intercept form.

$$y = a(x - p)(x - q)$$
$$-18 = a(0 - 9)(0 - 1)$$
$$-18 = 9a$$
$$a = -2$$

So, the equation of the parabola is $y = -2(x - 9)(x - 1)$.

12. Use the x-intercepts and the point to solve for a in intercept form.

$$y = a(x - p)(x - q)$$
$$0.05 = a(-2 + 7)(-2 + 3)$$
$$0.05 = 5a$$
$$a = 0.01$$

So, the equation of the parabola is $y = 0.01(x + 7)(x + 3)$.

14. The x-intercepts of the equation in A are $(-1, 0)$ and $(2, 0)$, and the point $(0.5, -4.5)$ satisfied the equation.

$2(0.5 - 2)(0.5 + 1) = 2(-1.5)(1.5) = -4.5$

The vertex of the equation in C is $(0.5, -4.5)$, and the points $(-1, 0)$ and $(2, 0)$ satisfies the equation.

$2(2 - 0.5)^2 - 4.5 = 2(2.25) - 4.5 = 0$

$2(-1 - 0.5)^2 - 4.5 = 2(2.25) - 4.5 = 0$

So, equations A and C represent the parabola.

16. The vertex of the parabola is $(0, 180)$ and an additional point is $(1, 164)$. Use the vertex and the point to solve for a in vertex form.

$y = a(x - h)^2 + k$

$164 = a(1 + 0)^2 + 180$

$164 = a + 180$

$-16 = a$

So, the equation of the parabola is $y = -16x^2 + 180$.

18. The vertex of the parabola is $(3, 1)$ and an additional point is $\left(1, \frac{5}{9}\right)$. Use the vertex and the point to solve for a in vertex form.

$y = a(x - h)^2 + k$

$\frac{5}{9} = a(1 - 3)^2 + 1$

$-\frac{4}{9} = 4a$

$a = -\frac{1}{9}$

So, the equation of the parabola is $y = -\frac{1}{9}(x - 3)^2 + 1$.

20. The x-intercepts of the parabola are 0 and 7 and an additional point is (1, 6). Use the x-intercepts and the point to solve for a in intercept form.

$$y = a(x - p)(x - q)$$

$$6 = a(1 + 0)(1 - 7)$$

$$6 = -6a$$

$$-1 = a$$

So, the equation of the parabola is $y = -x(x - 7)$. When the width is 1 meter, the area is 6 square meters. So, the length is $6 \div 1 = 6$ meters. The rectangle with the largest area is the rectangle that has the x-coordinate of the vertex as its width. Find the x-coordinate of the vertex. First, rewrite the equation.

$$y = -x(x - 7)$$

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

The coordinates of the vertex are:

$$x = -\frac{b}{2a} = -\frac{7}{2(-1)} = 3.5$$

$$y = -\left(\frac{7}{2}\right)\left(\frac{7}{2} - 7\right) = 12.25$$

The width of the rectangle with the largest area is 3.5 meters with a length of $\frac{12.25}{3.5} = 3.5$ meters.

22. Step 1 The input values are equally spaced. So, analyze the differences in the outputs to determine what type of function you can use to model the data.

$y(0.5)$	$y(1)$	$y(1.5)$	$y(2)$
18	24	22	12

First differences: -6, 2, 10

Second differences: -8, -8

Because the second differences are constant, you can model the data with a quadratic function.

Step 2 Write a quadratic function of the form $y = ax^2 + bx + c$ that models the data. Use any three points (x, y) from the table to write a system of equations.

Use (0.5, 18): $18 = 0.25a + 0.5b + c$

Use (1, 24): $24 = a + b + c$

Use (2, 12): $12 = 4a + 2b + c$

Use the elimination method to solve the system.

$$\begin{array}{r} a + b + c = 24 \\ -(0.25a + 0.5b + c = 18) \\ \hline 0.75a + 0.5b = 6 \end{array}$$

$$\begin{array}{r} 4a + 2b + c = 12 \\ -(0.25a + 0.5b + c = 18) \\ \hline 3.75a + 1.5b = -6 \end{array}$$

$$\begin{array}{r} 3.75a + 1.5b = -6 \\ -(2.25a + 1.5b = 18) \\ \hline 1.5a = -24 \end{array}$$

$a = -16$

$b = 36$

$c = 4$

The data can be modeled by the equation
$y = -16x^2 + 36x + 4$.

Step 3 Evaluate the function when $x = 1.7$.

$y = -16(1.7)^2 + 36(1.7) + 4 = 18.96$

The height of the baseball is 18.96 feet.

24. Using technology, create a scatter plot. The data show a quadratic relationship. Find the quadratic equation. The values in the equation can be rounded to obtain $f(x) = -0.5x^2 + 5.9x + 1.4$ with $R^2 = 0.9944$.

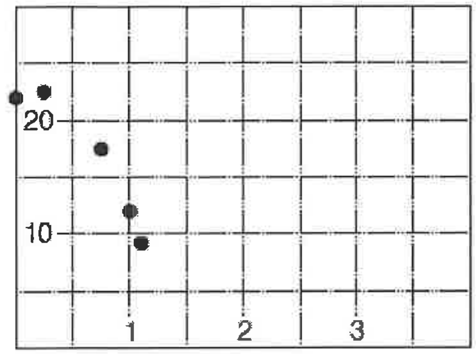
$f(10) = -0.5(10)^2 + 5.9(10) + 1.4 = 10.4$

So, the number of students absent 10 days after the outbreak is about 10.4 students.

26. No. Because the axis of symmetry is always directly between the x-intercepts, the axis of symmetry will be the same. The vertices could have different y-coordinates, and therefore different equations.

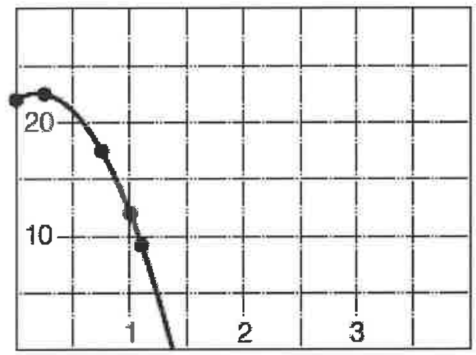
28. Because the x-values are not equally spaced, you cannot analyze the differences in the outputs. Use a graphing calculator to find a function that models the data.

Enter the data in a graphing calculator using two lists and create a scatter plot. The data show a quadratic relationship.



Use the *quadratic regression* feature. A quadratic model that represents the data is $y = -16x^2 + 6x + 22$.

Graph the regression equation with the scatter plot.



Using the *trace* feature, the water-skier is 5 feet above the air after about 1.24 seconds. Using the *trace* feature, the water skier is in the air for 1.375 seconds.

30.

$y(0)$	$y(1)$	$y(2)$	$y(3)$	$y(4)$
40	42	44	46	48

First differences: 2, 2, 2, 2

The first differences are constant, so the data can be modeled by a linear equation. Write a linear equation of the form $y = ax + b$ that models the data. Use any two points (x, y) from the table to write a system of equations.

Use (0, 40): $b = 40$

Use (1, 42): $a + b = 42$

Solve the system.

$a = 2$

$b = 40$

The data can be modeled by the equation $y = 2x + 40$.

32.

x	1	2	3	4
y	320	303	254	173

First differences: −17, −49, 81

Second differences: −32, 130

Neither the first nor second differences are constant, so the data cannot be modeled by either a linear or quadratic equation.