

Chap 3: Quadratics

Practice "Test"

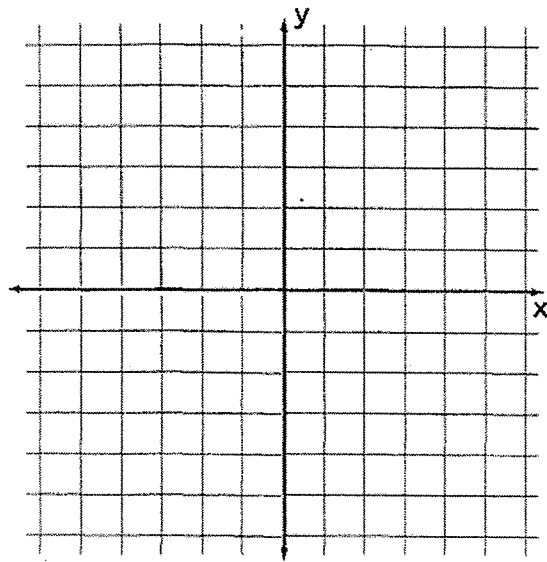
1. Write a rule for g and then identify the vertex. $f(x) = x^2$. It undergoes a vertical stretch by a factor of 3, then a reflection in the x -axis, followed by a translation 3 units down.
2. Describe the transformation of the graph of the parent quadratic function.

$$f(x) = \frac{1}{3}(x - 2)^2 + 1$$

3. Write the quadratic function in standard form that has vertex $(-1, -2)$ and passes through point $(-4, 7)$

4. Graph the function. Label 5 critical points and the axis of symmetry.

$$g(x) = -\frac{1}{2}(x + 3)^2 + 2$$



5. State the intervals in which the function is increasing and decreasing.

$$y = -\frac{1}{3}x^2 - 2x + 3$$

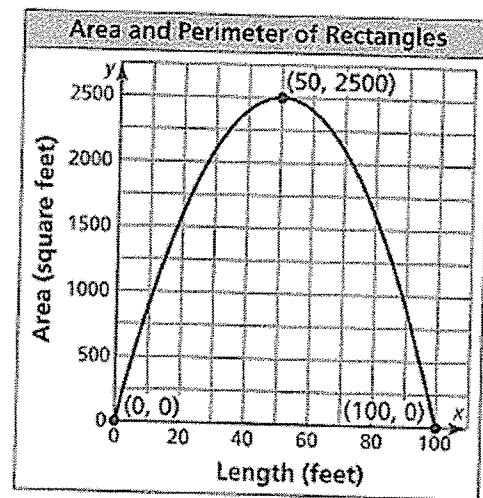
Increasing interval: _____ decreasing interval _____

6. The height of a bridge is given by $y = -3x^2 + x$, where y is the height of the bridge (in miles) and x is the number of miles from the base of the bridge.
- How far from the base of the bridge does the maximum height occur?
 - What is the maximum height of the bridge?

7. Write the equation of the parabola in intercept form.
 x -intercepts of -7 and -1 ; passes through $(1, 1)$

8. Write the equation of the parabola in vertex form.
 passes through $(4, -7)$ and has vertex $(1, -6)$

9. The graph shows the area y (in square feet) of rectangles that have a perimeter of 200 feet and a length of x feet.
- Interpret the meaning of the vertex in this situation.
 - Write an equation for the parabola to predict the area of the rectangle when the length is 2 feet.
 - Compare the average rates of change in the area from 0 to 50 feet and 50 to 100 feet.



10. A basketball is thrown up in the air toward the hoop. The table shows the heights y (in feet) of the basketball after x seconds. Find the height of the basketball after 5 seconds. Round your answer to the nearest hundredth.

Time, x	0	9	18
Basketball height, y	6	10	6

THE POWER OF THE QUADRATIC EQUATION
Solve each problem. DO ON NOTEBOOK PAPER!!!

1. The sum of the squares of two consecutive integers is 265. Find the integers.
2. The length of Hillcrest Garden is 6 feet more than its width. A walkway 3 feet wide surrounds the outside of the garden. The total area of the walkway is 288 square feet. Find the dimensions of the garden.
3. If a number is increased by its square, the result is 72. Find the number.
4. The sum of a number and its reciprocal is $\frac{10}{3}$. Find the number.
5. The Hillside Garden Club wants to double the area of its rectangular display of roses. If it is now 6 meters by 4 meters, by what equal amount must each dimension be increased?
6. A rectangular garden 25 feet by 50 feet is increased on all sides by the same amount. Its area increases 400 square feet. By how much is each dimension increased?
7. Jim Finley is a professional photographer. He has a photo 8 centimeters long and 6 centimeters wide. A customer wants a print of the photo. The print is to have half the area of the original. Jim plans to reduce the length and width of the photo by the same amount. What are the dimensions of the print?
8. The square of a number increased by 21 is equal to 10 times the number. Find the number.
9. Thirty decreased by one-half of a number is one-sixth of the square of the number. Find the number.
- ~~10.~~ The Pinetown Recreation Bureau planned to build an ice-skating rink with dimensions 30 meters by 60 meters. Their budget has been cut, so they must reduce the area of the rink by 1000 square meters. A strip will be removed from one end, and a strip of the same width will be removed from one side. Find the width of the strips.

Answers:

"Solving problems with quadratic equations"

② #A's = 7 ; #B's = 8

③ 6, 8, 10

"The Power of the Quadratic Equation"

① 11, 12 or -11, -12

② 18 ft, 24 ft

③ -9, 8

⑤ 2 m

⑥ $2\frac{1}{2}$ ft each side ; 5 ft total

⑧ 3, 7

⑨ -15, 12

Name _____

Advanced Algebra (H)

Solving problems with quadratic equations.

1. A cement walk of uniform width surrounds a rectangular swimming pool that is 10 m wide and 50 m long. Find the width of walk if its area is 864 m^2 .

2. The sum of the number of A's and B's on a math test is 15. There are more B's than A's, and the sum of the squares of the two numbers is 113. find the number of A's and the number of B's.

3. The lengths of the three sides of a right triangle are consecutive even integers. Find the length of each side of the triangle.

4. The length of a rectangular table is 1 foot more than twice the length of a side of a square rug and the width of the table is 3 feet less than the length of a side of the rug. If the area of the table is 81 ft^2 greater than the area of the rug, what is the area of the rug?

1. Describe the transformation of the graph of the parent quadratic function.

a. $f(x) = -3(x + 6)^2 - 4$

b. $g(x) = \frac{1}{3}x^2 + 2$

c. $g(x) = \frac{1}{3}(x + 1)^2$

2. Write a rule for g described by the transformations of the graph of f .

a. $f(x) = x^2$; vertical shrink by a factor of $\frac{1}{2}$ and a reflection in the y -axis, followed by a translation 2 units left

b. $f(x) = x^2$; vertical stretch by a factor of 2 and a reflection in the x -axis, followed by a translation 3 units down

c. $f(x) = x^2$; vertical shrink by a factor of $\frac{1}{2}$, followed by a translation 3 units left

3. State the intervals in which the function is increasing and decreasing.

$$f(x) = \frac{1}{2}x^2 + 3x + 7$$

Increasing interval: _____ decreasing interval _____

4. State the intervals in which the function is increasing and decreasing.

$$y = -x^2 - 6x$$

Increasing interval: _____ decreasing interval _____

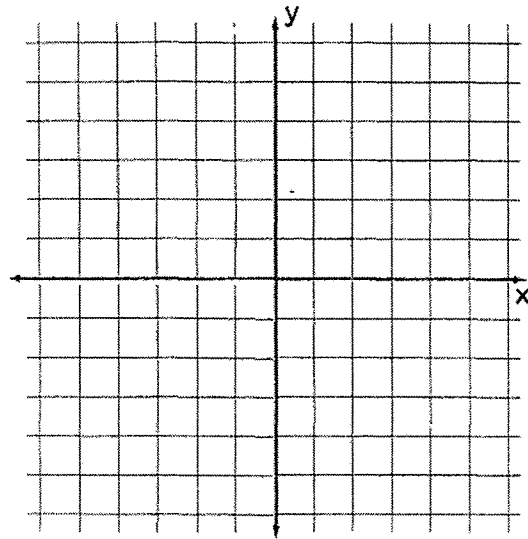
5. Write the quadratic function in standard form.

a. vertex $(-2, 9)$ and passes through point $(1, -9)$

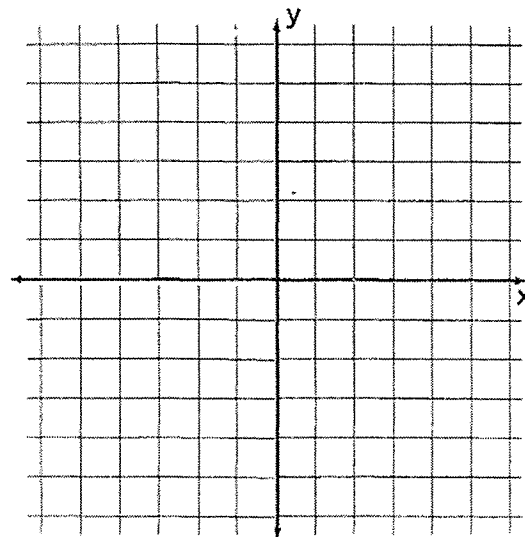
b. vertex $(-1, 0)$ and passes through point $(-3, -12)$

6. Graph the function. Label critical points and the axis of symmetry.

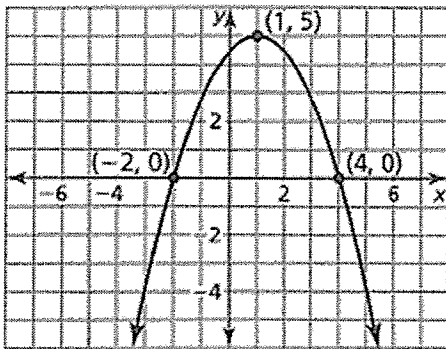
a. $y = 1.5x^2 - 6x + 3$



b. $h(x) = \frac{1}{2}(x - 2)^2 - 1$



7. Use the parabola shown.



- Write an equation of the parabola in vertex form.
- Expand the equation in part (a) to the form $y = ax^2 + bx + c$.
- Write an equation of the parabola in intercept form.
- Expand the equation in part (c) to the form $y = ax^2 + bx + c$.

8. **MODELING WITH MATHEMATICS** A baseball is thrown up in the air. The table shows the heights y (in feet) of the baseball after x seconds. Write an equation for the path of the baseball. Find the height of the baseball after 5 seconds.

Time, x	0	2	4	6
Baseball height, y	6	22	22	6

9. **MODELING WITH MATHEMATICS** The table shows the distances y a motorcyclist is from home after x hours.

Time (hours), x	0	1	2	3
Distance (miles), y	0	45	90	135

- Determine what type of function you can use to model the data. Explain your reasoning.
- Write and evaluate a function to determine the distance the motorcyclist is from home after 6 hours.

