



Problem 1 – Stretching a Parabola

On page 1.4 is a graph of the function, $f(x) = x^2$. Click on the arrows to change the value of the coefficient of x^2 .

1. What part of the equation changes as the graph is stretched?
2. When the coefficient of x^2 becomes negative, what happens to the graph?
3. On page 1.7, is the coefficient of x^2 positive or negative?
4. What is a possible coefficient of x^2 in the graph on page 1.8?

Problem 2 – Translating a Parabola

On page 2.2 is a graph of the function, $f(x) = x^2$. Click on the arrows to change the values for h and k .

5. How does the equation change?

The vertex form equation for a quadratic is $y = a(x - h)^2 + k$.

6. What does (h, k) represent?
7. What is the vertex of the graph on page 2.5?

8. What is the vertex of the function $f(x) = (x - 3)^2 + 1$?
9. Which of the following functions has (have) a vertex at $(-1, 1)$?
- $$a(x) = 2(x - 1)^2 + 1$$
- $$b(x) = -1(x + 1)^2 - 1$$
- $$c(x) = -3(x + 1)^2 + 1$$
10. Write an equation with a vertex of $(-2, 3)$. Check your work by graphing it on page 2.9.
11. Write a second equation with a vertex of $(-2, 3)$, if possible. If it is not possible, explain why.

Problem 3 – Finding Zeros of a Quadratic Graphically

For the graphs on pages 3.2, 3.4, and 3.6, grab the point on the graph and move it to find the maximum/minimum and the zeros.

12. What is (are) the zero(s) of the function on page 3.2?
13. What is (are) the zero(s) of the function on page 3.4?
14. What is (are) the zero(s) of the function on page 3.6?



Problem 4 – Connecting Zeros to Equation

Find the zeros for each given function. Select **MENU > Points & Lines > Intersection Points** to find the intersection between the parabola and x -axis to determine the zeros. Select the graph and then the x -axis.

15. How does the factored equation at the bottom of the page help find the zeros?

16. For the factored form equation, $y = a(x - p)(x - q)$, what do p and q represent?

17. What are the zeros of the function on page 4.8?