**Finding *x*-intercepts of Parabolas**

For each of the quadratic functions in 1 – 6 do the following work on a separate sheet of paper.

1. Sketch a graph (either by making a table or using a calculator).
2. Estimate the values of *x* at the *x*-intercepts (if there are any).
3. Set *y* = 0 and solve the equation for *x*. Leave a radical in the answer if you don’t have an exact square root.
4. Find decimal approximations for the *x*-intercepts.
5. Compare the decimal approximations from (d) with the estimates you made in (b).

1. 

2.

3. 

4. 

5. 

6. 

1. All of the above functions were given in vertex form. The vertex form of a quadratic function is . There is a relationship between the parameters *a* and *k* and the number of *x*-intercepts. Look at your solutions for equations 1 – 6 and then fill in the table below.

|  |  |  |
| --- | --- | --- |
| **When** | **and** | **Then the number of solutions is (0, 1 or 2?)** |
| *a*  is positive | *k* is positive |  |
| *a*  is positive | *k* is negative |  |
| *a*  is negative | *k* is positive |  |
| *a*  is negative | *k* is negative |  |
| *a*  is positive or negative | *k* is zero |  |

1. Now write four quadratic functions of your own in vertex form. Without graphing the functions, make predictions for each function in the table below:
2. *y*  =
3. *y* =
4. *y* =
5. *y*  =

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function** | **For this function** | **and** | **How many *x-*intercepts will the graph have?** | **The vertex will be in which quadrant (or on which axis)?** |
| a. | *a*  is \_\_\_\_\_\_\_\_\_ | *k*  is \_\_\_\_\_\_\_\_\_ |  |  |
| b. | *a*  is \_\_\_\_\_\_\_\_\_ | *k*  is \_\_\_\_\_\_\_\_\_ |  |  |
| c. | *a*  is \_\_\_\_\_\_\_\_\_ | *k*  is \_\_\_\_\_\_\_\_\_ |  |  |
| d. | *a*  is \_\_\_\_\_\_\_\_\_ | *k*  is \_\_\_\_\_\_\_\_\_ |  |  |

1. Solve the problem from the opener for this investigation:

A hitter at Fenway Park hits a ball with equation where *y* is the height of the ball and *x* is the horizontal distance of the ball from home plate. Both values are given in feet.

1. How far will the ball travel before it hits the ground?

1. If the ball is hit toward deep center field, where the fence is 420 feet will it travel far enough to be a home run?
2. There are two solutions to the quadratic equation in problem 9. Explain why only one of the solutions makes sense in the context of this problem.