**Using the Quadratic Formula**

1. Fill in the blanks below:

* The quadratic formula gives solutions to the equation \_\_\_\_\_\_.

This formula may also be used to find the \_\_\_-intercepts for the function

.

* The quadratic formula states that . This formula gives two possible values for *x.* The first is . The second value is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Notice that the first term in the formula, , is the \_\_\_-coordinate of the vertex of the parabola.
* is the equation of the parabola’s line of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* The expression under the radical symbol, , is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Use the quadratic formula to solve the equation .

Step 1. Identify *a, b,* and *c*: *a = \_\_\_\_\_\_\_ b = \_\_\_\_\_\_\_ c = \_\_\_\_\_\_\_\_*

Step 2. Substitute: *x* = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Step 3. Write out the two values for *x.*  Leave radicals in your answers.

*x =\_\_\_\_\_\_\_\_\_\_\_* or *x* = \_\_\_\_\_\_\_\_\_\_\_\_

Step 4. Use a calculator to find approximate values of *x* (to the nearest 0.001).

*x ≈ \_\_\_\_\_\_\_\_\_\_\_* or *x* ≈ \_\_\_\_\_\_\_\_\_\_\_\_

1. a. Solve the equation by completing the square.

b. Solve using the quadratic formula.

c. Show that your solutions are equivalent.

1. a. Solve the equation by factoring.

b. Solve using the quadratic formula.

c. Show that your solutions are equivalent.

d. Here’s how one student solved using the quadratic formula:

*a* = 1, *b* = –7, c = –18.

Find this student’s mistake and correct it.

1. The function models the height of a soccer ball in meters *x* seconds after it has been kicked.
2. Use the quadratic formula to find the maximum height and the time it takes the ball to reach the ground.



1. Sketch a graph of the function based on the results of (a).
2. Check your answer to (b) with a graphing calculator.
3. For each quadratic function, find the value of the discriminant . Then use a calculator to make a graph and determine the number of *x*-intercepts.

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| --- | --- | --- | --- |
| **Function** | **Value of** | **Is the discriminant positive, negative, or zero?** | **Number of**  ***x*-intercepts** |
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|  |  |  |  |

1. Based on the above table, is there a relationship between the discriminant and the number of *x*-intercepts? Make a conjecture and explain why it might be true.