Lesson 15: Using the Quadratic Formula

Classwork

Opening Exercises

Solve the following:

1. $4x^2 + 5x + 3 = 2x^2 - 3x$

2. $c^2 - 14 = 5c$

Exercises

Solve Exercises 1–5 using the quadratic formula.

1. $x^2 - 2x + 1 = 0$

2. $3b^2 + 4b + 8 = 0$

3. $2t^2 + 7t - 4 = 0$

4. $q^2 - 2q - 1 = 0$

5. $m^2 - 4 = 3$

For Exercises 6–9, determine the number of real solutions for each quadratic equation without solving.

6. $p^2 + 7p + 33 = 8 - 3p$

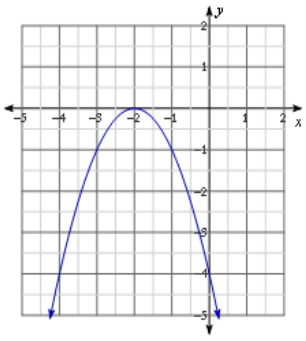
7. $7x^2 + 2x + 5 = 0$

8. $2y^2 + 10y = y^2 + 4y - 3$

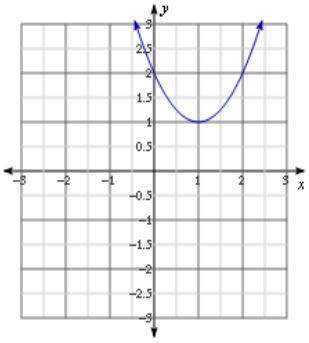
9. $4z^2 + 9 = -4z$

10. On the line below each graph, state whether the discriminant of each quadratic equation is positive, negative, or equal to zero. Then, identify which graph matches the discriminants below.

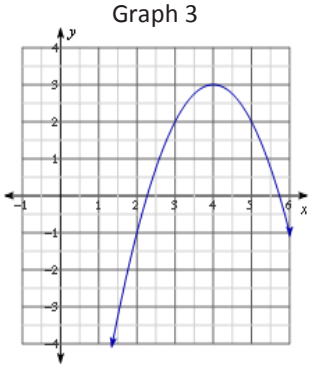
Graph 1



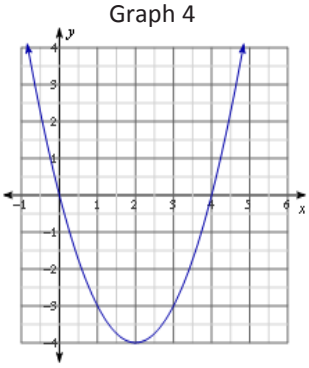
Graph 2



Graph 3



Graph 4



_____ _____ _____ _____

Discriminant A: $(-2)^2 - 4(1)(2)$

Graph: _____

Discriminant B: $(-4)^2 - 4(-1)(-4)$

Graph: _____

Discriminant C: $(-4)^2 - 4(1)(0)$

Graph: _____

Discriminant D: $(-8)^2 - 4(-1)(-13)$

Graph: _____

Lesson Summary

You can use the sign of the discriminant, $b^2 - 4ac$, to determine the number of real solutions to a quadratic equation in the form $ax^2 + bx + c = 0$, where $a \neq 0$. If the equation has a positive discriminant, there are two real solutions. A negative discriminant yields no real solutions, and a discriminant equal to zero yields only one real solution.

Problem Set

Without solving, determine the number of real solutions for each quadratic equation.

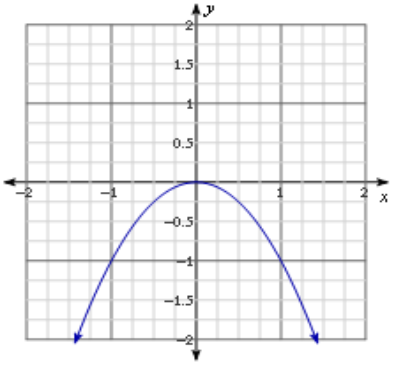
1. $b^2 - 4b + 3 = 0$

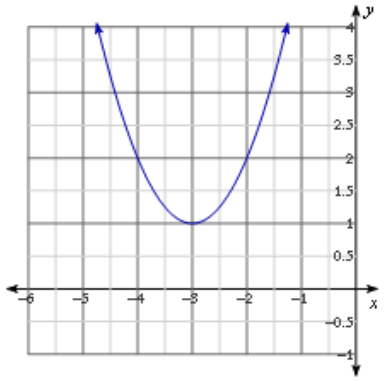
2. $2n^2 + 7 = -4n + 5$

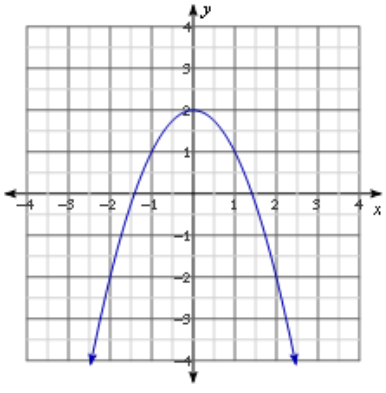
3. $x - 3x^2 = 5 + 2x - x^2$

4. $4q + 7 = q^2 - 5q + 1$

Based on the graph of each quadratic function, $y = f(x)$, determine the number of real solutions for each corresponding quadratic equation, $f(x) = 0$.

5. 

6. 

7. 

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