**10.7: Interpret the Discriminant**

**Goals:** \* Identify the discriminant of the quadratic formula

 \* Use the discriminant to decide the number of solutions a quadratic equation has

· What are the possible number of solutions a quadratic equation can have?



Sketch a parabola to represent each possibility.

**Discriminant:** *b*² – 4*ac*

· What happens to the discriminant in the quadratic formula? It gets square-rooted

Use your knowledge of square roots to determine how you would use the discriminant to identify the number of solutions to a quadratic equation.

If the discriminant is > 0, then there are two solutions

If the discriminant is < 0, there there are no solutions

If the discriminant = 0, then there is one solution

**Ex:** 2*x*² + 6*x* + 5 **Ex:** *x*² – 7 = 0 **Ex:** 4*x*² – 12*x* + 9

Discriminant = –4 Discriminant = 28, 2 solutions Discriminant = 0

No solutions 2 Solutions 1 solution

**Tell whether the following equation has *two solutions*, *one solution*, or *no solution*.**

**Ex:** 3*x*² – 7 = 2*x* **Ex:** *x*² + 4*x* + 3 = 0 **Ex:** 2*x*² – 5*x* + 6 = 0

2 solutions 2 Solutions No solution

**Ex:** –*x*² + 2*x* = 1 **Ex:** 3*x*² + 8*x* + 7 = 0 **Ex:** *x*² + 2*x* – 3 = 0

1 solution No solution 2 solutions

**Ex:** 4*x*² + 20*x* + 25 = 0

1 solution

**Find the number of *x*-intercepts of the graph of:**

**Ex:** *y* = *x*² + 5*x* + 8 **Ex:** *y* = *x*² + 7*x* – 2 **Ex:** *y* = *x*² + 10*x* + 25

None 2 intercepts 1 intercept

**Ex:** *y* = *x*² – 9*x* **Ex:** *y* = –*x*² + 2*x* – 4 **Ex:** *y* = 4*x*² + 4*x* + 1

 2 solutions None None