

Warm up

week 4

Use the Quadratic Formula

Use the quadratic formula to solve the equation.

$$4x^2 - 13x + 3 = 0$$

$$a = 4, b = -13, c = 3$$

$$x = \frac{13 \pm \sqrt{(-13)^2 - 4(4)(3)}}{2(4)}$$

$$= \frac{13 \pm \sqrt{121}}{8}$$

$$x = \frac{13 + 11}{8}$$

$$x = \frac{13 - 11}{8}$$

$$x = \frac{24}{8}$$

$$x = \frac{2}{8}$$

$$x = 3$$

$$x = \frac{1}{4}$$

AND

Quiz out of 22pts

A - 20

B - 18

C - 15.5

D - 13.5

Homework Questions?

Self Scoring Scale

4- I can *summarize* the concepts and explain it to others.

3- I can *apply* the concepts to answer questions correctly.

2- I can *apply* the concepts but with some *mistakes*.

1- I *need help* to know how to apply the concepts.

0- I *can't* apply the concepts even with help.

9.7 Using the Discriminant

Goals: • Use the discriminant to determine the number of solutions of a quadratic equation.

EQ: What is the discriminant and what does it tell us?

② LAST UNIT/Experience Exponents	① CURRENT UNIT Quadratic Equations	③ NEXT UNIT/Experience Factoring
⑧ Student Activities or Assignments	⑤ UNIT MAP <pre> graph TD A((Graphing and solving quadratic equations)) --> B[Finding square roots] A --> C[Simplifying radicals] A --> D[Graphing quadratics] A --> E[Quadratic Formula] A --> F[Finding the discriminant] style F stroke:#f00,stroke-width:2px </pre>	
⑦ UNIT SELF-TEST QUESTIONS	1. How can you solve a quadratic equation by using square roots? 2. How do you simplify radical expressions? 3. What steps are necessary to graph a quadratic equation? 4. How is the quadratic formula used to solve a quadratic equation? 5. How is the discriminant found and what information does it tell you?	⑥ UNIT RELATIONSHIPS Solve Simplify Graph Compare.

Vocabulary

Discriminant:

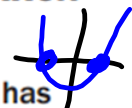
$b^2 - 4ac$
in the quadratic formula

Recall that positive real numbers have two square roots, zero has only one square root, and negative numbers have no real square roots.

THE NUMBER OF SOLUTIONS OF A QUADRATIC EQUATION

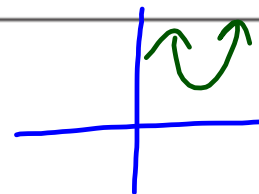
Consider the quadratic equation $ax^2 + bx + c = 0$.

- If the value of $b^2 - 4ac$ is positive, then the equation has 2 solutions
- If the value of $b^2 - 4ac$ is zero, then the equation has 1 solution
- If the value of $b^2 - 4ac$ is negative, then the equation has No Soln.



$\sqrt{25}$
 $\sqrt{0}$
 $\sqrt{-36}$

(No Real Soln)



Example 1: Finding the Number of Solutions

Determine the number of solutions of $x^2 - 2x - 9 = 0$ by finding the value of the discriminant.

$$a=1, b=-2, c=-9$$

$$b^2 - 4ac$$

$$(-2)^2 - 4(1)(-9)$$

$$4 + 36$$

$$40$$

pos. #

2 solns

Example 2: Finding the Number of Solutions

Find the value of the discriminant. Then use the value to determine whether the equation has *two solutions*, *one solution*, or *no real solution*.

a) $x^2 - 8x + 16 = 0$

$$a=1, b=-8, c=16$$

$$(-8)^2 - 4(1)(16)$$

$$64 - 64$$

$$0 \leftarrow 1 \text{ soln}$$

b) $-3x^2 + 4x - 5 = 0$

$$a=-3, b=4, c=-5$$

$$4^2 - 4(-3)(-5)$$

$$16 - 60$$

$$-44$$

No Real soln

Try It Tell if the equation has two solutions, one solution, or no real solution.

1) $-x^2 - 5x - 9 = 0$

$a = -1, b = -5, c = -9$

$(-5)^2 - 4(-1)(-9)$

$25 - 36$

-11

No soln

2) $4x^2 - 4x + 1 = 0$

$a = 4, b = -4, c = 1$

$b^2 - 4ac$

$(-4)^2 - 4(4)(1)$

$16 - 16 = 0$

One solution

3) $8x^2 + 8x + 1 = 0$

$a = 8, b = 8, c = 1$

$8^2 - 4(8)(1)$

$64 - 32 = 32$

2 solutions

4) $\frac{1}{2}x^2 - x - 4 = 0$

$a = \frac{1}{2}, b = -1, c = -4$

$b^2 - 4ac$

$(-1)^2 - 4(\frac{1}{2})(-4)$

$1 + 8 = 9$

2 soln

Example 3: Finding the Number of x-intercepts

Determine whether the graph of the function will intersect the x-axis in zero, one, or two points.

a) $y = x^2 - 2x - 1$

$a = 1, b = -2, c = -1$

$(-2)^2 - 4(1)(-1)$

$4 + 4$

8

2 soln

b) $y = x^2 - 2x + 3$

$a = 1, b = -2, c = 3$

$(-2)^2 - 4(1)(3)$

$4 - 12$

-8

No Real soln

Try It

Determine whether the graph of the function will intersect the x-axis in *zero, one, or two points*.

5) $y = x^2 - 2x + 1$

$a = 1, b = -2, c = 1$

$(-2)^2 - 4(1)(1)$

$4 - 4$

0

1 sol'n

6) $y = x^2 - 4x + 5$

$a = 1, b = -4, c = 5$

$(-4)^2 - 4(1)(5)$

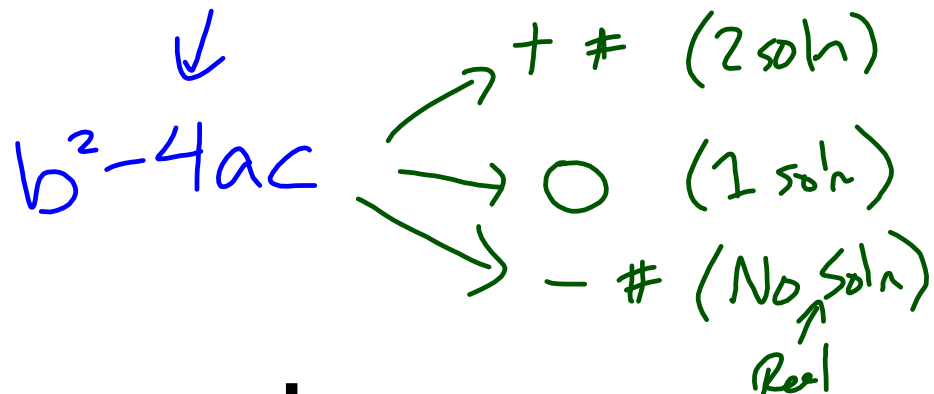
$16 - 20$

-4

No sol'n

Summary

EQ: What is the discriminant and what does it tell us?

**9.7 Homework**

p.543 #7-9, 14-32even, 35-37