Algebra 2 4.6

Solve quadratic equations by using the quadratic formula

Use the discriminant to determine the number and type of roots for a quadratic equation

standard form (of a quadratic)

discriminant

quadratic formula

complex number

conjugate pair

irrational number

exact answer

QF song

$\frac{24 \pm \sqrt{240}}{8}$

240

24 10

6 4 2 5

2 3 2 2

$2 \cdot 2\sqrt{15}$

$\frac{24 \pm 4\sqrt{15}}{8}$

$\frac{3 \pm \sqrt{15}}{2}$

whiteboards

## GuidedPractice

**Solve each equation by using the Quadratic Formula.**

**4A.** $3x^2 + 5x + 4 = 0$

$$\frac{-5 \pm \sqrt{25 - 4 \cdot 3 \cdot 4}}{6}$$

$$= \frac{-5 \pm \sqrt{25 - 48}}{6}$$

$$= \frac{-5 \pm \sqrt{23}\, i}{6}$$

$$= -\frac{5}{6} \pm \frac{\sqrt{23}\, i}{6}$$

$$-\frac{5}{6} \pm \frac{i\sqrt{23}}{6}$$

**4B.** $x^2 - 4x = -13$

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

$$\sqrt{(x-2)^2} = \sqrt{-9}$$

$$x - 2 = \pm 3i$$

$$+2 \quad +2$$

$$x = 2 \pm 3i$$

**2 Roots and the Discriminant** In the previous examples, observe the relationship between the value of the expression under the radical and the roots of the quadratic equation. The expression $b^2 - 4ac$ is called the **discriminant**.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad \leftarrow \text{discriminant}$$

d = pos real + rational
P.S.
nops real irrat
d = 0 1 real (DR) rational
d = neg 2 imag

Just the part in RED!

**GuidedPractice**

**5A.** $-5x^2 + 8x - 1 = 0$

**5B.** $-7x + 15x^2 - 4 = 0$

$15x^2 - 7x - 4 = 0$

Discriminant: number and type of roots

$(b^2 - 4ac)$

$64 - 4 \cdot -5 \cdot -1$

$= 64 - 20 = 44$

Solve by CTS

$$\frac{2x^2}{2} + \frac{18x}{2} + \frac{12}{2} = \frac{0}{2}$$

$\frac{9}{2} \cdot \frac{9}{2}$

$$x^2 + 9x + 6 = 0$$

$x^2+9x+\frac{81}{4} = -6+\frac{81}{4} = 14\frac{1}{4}$

Quiz 4.5-4.6

$$\sqrt{\left(x+\frac{9}{2}\right)^2} = \sqrt{\frac{57}{4}}$$

57

14 3

$$x+\frac{9}{2} = \pm\frac{\sqrt{57}}{2}$$

$$x = -\frac{9}{2} \pm \frac{\sqrt{57}}{2}$$

2

SRP

CTS

QF