Trig 4.2

Solve quadratic equations (factor, CTS, QF)*
Use the discriminant to describe roots

completing the square   CTS

(factor)
quadratic formula   QF

*Algebra 2 Ch. 6
Also Alg. 1

discriminant
(nature of the roots)

conjugates

Quadratic formula song

Algebra tiles

$x^2 + 6x + ?\,9$ $(x+3)^2$

$x^2 + 10x + ?\,25$ $(x+5)^2$

Complete the square (what is missing?)

$x^2 + 8x + 9$ $(x+4)^2$

$x^2 - 6x + 5$

$(x-3)^2$

Solve each equation by completing the square.

5. $x^2 + 8x - 20 = 0$ $+20$ $+20$

$x^2 + 8x + 16 = 20 + 16$

$\sqrt{(x+4)^2} = \sqrt{36}$

$x+4$
$x+4$

$y^2 \; (4x)(4x) \; 16$

$x+4 = \pm 6$
$-4 \qquad -4$

$x = -4 + 6 = 2$
$\quad -4 - 6 = -10$

Build a perfect square...

:(Only complete ONE square!

2 Solve $3n^2 + 7n + 7 = 0$ by completing the square.

$$\frac{}{3} \quad \frac{}{3} \quad \frac{}{3} \quad \frac{}{3}$$

$$n^2 + \frac{7}{3}n + \frac{49}{36} = -\frac{7}{3} + \frac{49}{36}$$

$$a + bi$$

$$\frac{7}{3} \cdot \frac{1}{2} \qquad \sqrt{\left(n + \frac{7}{6}\right)^2} = \sqrt{-\frac{35}{36}}$$

$$\frac{7}{6} \cdot \frac{7}{6} \qquad n + \frac{7}{6} = \pm\frac{\sqrt{35}\,i}{6}$$

$$\boxed{\frac{-7}{6} \pm \frac{\sqrt{35}\,i}{6}}$$

$$-\frac{7}{6} \quad -\frac{7}{6}$$

$$n = -\frac{7}{6} \pm \frac{\sqrt{35}\,i}{6}$$

$$\frac{-7 \pm \sqrt{35}\,i}{6}$$

How do you choose a method to solve???

① **Solve** $x^2 - 6x - 16 = 0$.

$$(X-8)(x+2) = 0$$

$\downarrow$ $\downarrow$

$$X-8=0 \qquad x+2=0$$

$$X=8 \qquad X=-2$$

-16

-8 ✕ 2

-6

1   16
2   8
4   4

Options:

factor
QF ✓
CTS ✓

QF song!

Quadratic Formula	The roots of a quadratic equation of the form $ax^2 + bx + c = 0$ with $a \neq 0$ are given by the following formula. $$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

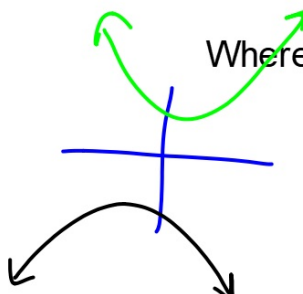Solve each equation.

28. $3s^2 - 5s + 9 = 0$

29. $x^2 - 3x - 28 = 0$

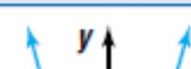**30.** $4w^2 + 19w - 5 = 0$

Choice of method

discriminant $b^2 - 4ac$

Where have you seen b^2-4ac before?

neg. non real   no x int
0   rational   double root
pos   real   2 ans

Discriminant	Nature of Roots/Zeros	Graph
		y

"nature of the roots" is not the same question as "solve"

4 Find the discriminant of $x^2 - 4x + 15 = 0$ and describe the nature of the roots of the equation. Then solve the equation by using the Quadratic Formula.

$b^2 - 4ac$

$-4 \cdot -4 - 4 \cdot 1 \cdot 15$

$16 - 60$

-44

$\sqrt{-44}$

$X = \dfrac{4 \pm \sqrt{-44}}{2}$

$= \dfrac{4}{2} \pm \dfrac{\sqrt{44}i}{2}$

$= \dfrac{4}{2} \pm \dfrac{2\sqrt{11}i}{2}$

$= 2 \pm \sqrt{11}i$

$= 2 \pm i\sqrt{11}$

$\begin{array}{c} 44 \\ 4 \wedge_{11} \\ 2 \overset{1}{2} \end{array}$

Find the discriminant of each equation and describe the nature of the roots of the equation. Then solve the equation by using the Quadratic Formula.

7. $m^2 + 12m + 36 = 0$

8. $t^2 - 6t + 13 = 0$

$12 \cdot 12 - 4 \cdot 1 \cdot 36$

$144 - 144$

0

$-6 \cdot -6 - 4 \cdot 1 \cdot 13$

$36 - 52$

-16

Find the discriminant of each equation and describe the nature of the roots of the equation. Then solve the equation by using the Quadratic Formula.

20. $6m^2 + 7m - 3 = 0$

21. $s^2 - 5s + 9 = 0$

22. $36d^2 - 84d + 49 = 0$

23. $4x^2 - 2x + 9 = 0$

4, 2
13-370
38-45
4, 2 WB