4/3 Algebra 1 - Downing

Solve: $x^2+8x-256=0$ Can either Factor or Complete the Square

Complete the square

$x^2+8x+\underline{16}=256+\underline{16}$

$\sqrt{(x+4)^2}=\sqrt{272}$

$x+4=16.49$ or -16.49

$-4 \quad -4 \quad -4$

$\boxed{x=12.49 \text{ or } -20.49}$

Solve: $4x^2-64=0$

$+64 \quad +64$

$\frac{4x^2}{4}=\frac{64}{4}$

$\sqrt{x^2}=\sqrt{16}$

$x=\pm 4$

Quadratic Formula

The real solutions of the quadratic equation $ax^2+bx+c=0$ are

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$ ← Quadratic Formula

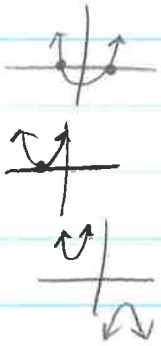
where $a\neq 0$ and $b^2-4ac\geq 0$.

b^2-4ac (discriminant)

If $b^2-4ac>0$ → two real solutions

If $b^2-4ac=0$ → one real solution

If $b^2-4ac<0$ → No real solutions



Ex) $x^2+8x-256=0$ $\quad a=1 \quad b=8 \quad c=-256$

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a} \rightarrow x=\frac{-8\pm\sqrt{(8)^2-4(1)(-256)}}{2(1)}$$

$$x=\frac{-8\pm\sqrt{1088}}{2}$$

$$x=\frac{-8+\sqrt{1088}}{2} \qquad x=\frac{-8-\sqrt{1088}}{2}$$

$x=12.49$ $\qquad$ $x=-20.49$

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

Ex) $2x^2 - 5x + 3 = 0$ $\quad x = \dfrac{5 \pm \sqrt{(-5)^2-4(2)(3)}}{2(2)}$

$$x = \frac{5 \pm \sqrt{1}}{4}$$

$$x = \frac{5+1}{4} \quad x = \frac{5-1}{4}$$

$$x = \frac{6}{4} \quad x = \frac{4}{4}$$

$x = 1.5$ $\quad x = 1$

WS → Quadratic Formula

#1 $3x^2 + 2x = 20$

$-20 \quad -20$

$3x^2 + 2x - 20 = 0$

$$x = \frac{-2 \pm \sqrt{(2)^2-4(3)(-20)}}{2(3)}$$

$$x = \frac{-2+\sqrt{244}}{6} \quad x = \frac{-2-\sqrt{244}}{6}$$

$x = 2.27$ $\quad x = -2.94$

#2 $v^2 + 9 = -6v$

$+6v \quad +6v$

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

$$x = \frac{-6 \pm \sqrt{(6)^2-4(1)(9)}}{2(1)}$$

$$x = \frac{-6 \pm \sqrt{0}}{2}$$

$x = -3$

HW → #3 + 4

Answers: #3 $x = 3.34 \quad x = -1.14$

#4 $x = 6.41 \quad x = -1.41$