4/22 Algebra I - Downing

9.5 C - Quadratic Formula - Review all solving methods

① Quadratic Formula: $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

- Can use ANY Time - must be in standard form
- When the number under the radical is...
  - Positive - 2 real solutions
  - Zero - 1 solution
  - Negative - No real solutions

② Solving By Factoring

- Doesn't always work
- Must be in standard form
- Sometimes it's a Pain

③ Solve by taking Square Roots

- Can use with vertex form
- When in standard form - "b" value must be zero
- Remember the ±

④ Graphing Calculator

2nd TRACE → zeros

Ex) Solve

$4x^2 + 10 = 11$ ← No "b" value - solve by taking square roots

$-10 \quad -10$

$\frac{4x^2}{4} = \frac{1}{4}$

$\sqrt{x^2} = \sqrt{\frac{1}{4}}$

$x = \pm\frac{1}{2}$ or $x = \frac{1}{2}$ $x = -\frac{1}{2}$

Ex) Find zeros by factoring

$3x^2 - 8 = -10x$

$+10x \quad +10x$

$3x^2 + 10x - 8 = 0$

$(3x^2 - 2x)(+12x - 8) = 0$

-24	
-1	24
-2	12
-3	8
-4	6

$x(3x-2) + 4(3x-2) = 0$

$(x+4)(3x-2) = 0$

$x + 4 = 0 \quad 3x - 2 = 0$

$-4 \quad -4 \quad +2 \quad +2$

$x = -4 \quad \frac{3x}{3} = \frac{2}{3}$

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

Ex) $1 - 8x = -16x^2$

$+16x^2 \quad +16x^2$

$16x^2 - 8x + 1 = 0$

$$x = \frac{8 \pm \sqrt{(-8)^2 - 4(16)(1)}}{2(16)}$$

$$\frac{8 + \sqrt{0}}{32} \qquad \frac{8 - \sqrt{0}}{32}$$

$$= \frac{8}{32} = \frac{1}{4}$$

#4 on HW worksheet

Flight of aircraft $h = -10x^2 + 300x + 9750$

h = height in meters

x = time in seconds

a) After how many seconds will it land on the ground?

plug in 0 for h $\quad 0 = -10x^2 + 300x + 9750$

$$x = \frac{-300 \pm \sqrt{(300)^2 - 4(-10)(9750)}}{2(-10)}$$

$$\frac{-300 + \sqrt{480{,}000}}{-20} \qquad \frac{-300 - \sqrt{480{,}000}}{-20}$$

$x = -19.6$ or $x = 49.6$ sec

b) Altitude after 20 seconds? Plug it in for x: $-10(20)^2 + 300(20) + 9750$

$h = 11{,}750$ ft.

c) What time is the plane at 8500 m? ← plug in for h

$8500 = -10x^2 + 300x + 9750$

$-8500 \qquad -8500$

$0 = -10x^2 + 300x + 1250$

$$x = \frac{-300 \pm \sqrt{(300)^2 - 4(-10)(1250)}}{2(-10)}$$

$$x = \frac{-300 + \sqrt{140{,}000}}{-20} \qquad \frac{-300 - \sqrt{140{,}000}}{-20}$$

$x = -3.7$ $\quad x = 33.7$

33.7 seconds

HW- finish HW worksheet