Name_____

Date_____

Advanced Algebra

Unit 4: Quadratics Assignment #6

We are continuing to grow this year with our algebraic solving skills. We have moved away from all things linear. The focus this year is your solving skills are as proficient in non-linear situations as they are in linear situations.

We have been focusing on solving a quadratic equation. To solve a quadratic means for the most part, you need all variables on one side and the other side set equal to 0. You can then use the quadratic formula.

Some of you have found some quicker more efficient ways to solve a quadratic rather than always using the quadratic formula. Some of you have made a connection to unit 3, where we raised both sides to the reciprocal power. When can we do that in this unit? The answer is if the equation is given to you in vertex form. You can easily find the roots by using your technique of solving a power function from unit 3. Some of you have become so proficient at transforming any given quadratic into vertex form, that using your power function technique can become your go to way to easily find the roots.

Example: $y= 10(x-8)^2-16$

$0=10(x-8)^2-16$ ⟶ $\frac{16}{10} = (x-8)^2$ ⟶ $(\frac{16}{10})^{\frac{1}{2}}=x-8$

So, for everybody if something is in vertex form, this is a great, efficient way to solve for the roots. We are making a connection to Unit 3 and power functions.

Solve the following quadratic equations anyway that you would like $x = \frac{-b\pm\sqrt{b^2-4ac}}{2a}$

Foundational:

$Y= (x-8)\ (\ x+10)$

8 and -10

$y= 4(x-6(x+12)$

6 and -12

$y=x^2+12x+35$

$(x+7)(x+5)$

-7 and -5

$Y= (x-2)^2-18$

$X= 2\pm\sqrt{18}$

$y= 4(x+12)^2 -22$

$4(x+12)^2 = 22$

$X=-12\pm\sqrt{\frac{22}{4}}$

$y=x^2-1x-20$

$(X-5)(X+4)$

X=5 and -4

$x^2-5 = 40$

$X^2 = 45$

$X = \pm\sqrt{45}$

$x^2+6=98$

$x^2=92$

$X = \pm\sqrt{92}$

$y=x^2-100$

$X = \pm 10$

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

Moderate:

For those of you becoming really proficient, the challenge is seeing when should I factor, when should I just use quadratic formula, and finally when should I use complete the square as a solving method? The common thread is you can always use the quadratic formula. Challenge yourself to understand for you when a certain technique might be good.

$y= 3x^2-18x+4$

$\frac{18 \pm \sqrt{18^2 - 4(3)(4)}}{6}$ $\frac{18 \pm 16.6}{6}$ 5.76, .233

$y=-2x^2+20x+12$

$\frac{-20 \pm \sqrt{20^2 - 4(-2)(12)}}{-4}$ $\frac{-20 \pm 22.3}{-4}$ -.57, 10.57

$y= x^2-18x-22$

$(x^2-18x+81)-81-22$

$(x-9)^2-103$

$x = 9 \pm \sqrt{103}$

$y= x^2-9x+27$

$(x^2-9x-20.25)+20.25+27$

$(x-4.5)^2+47.25$ No Roots

$y= x^2-10x+25$

$(x-5)^2$

$x=5$

$y= x^2+12x-18$

$(x^2+12x+36)-36-18$

$(x+6)^2-54$

$x = -6 \pm \sqrt{54}$

$y= 10x^2-18x+2$

$\frac{18 \pm \sqrt{18^2 - 4(10)(2)}}{20}$ $\frac{18 \pm 15.6}{20}$ 1.68, .12

$y= 22x^2-30x+12$

$\frac{30 \pm \sqrt{30^2 - 4(22)(12)}}{44}$ No Roots

$12x^2-18x+6= 10x^2-2x$

$2x^2-16x+6=0$

$\frac{16 \pm \sqrt{16^2 - 4(2)(6)}}{4}$ $\frac{16 \pm 14.4}{4}$ 7.6, .4

$14x^2-16x+12= 7x^2+12x-6$

$7x^2-28x+18=0$

$\frac{28 \pm \sqrt{28^2 - 4(7)(18)}}{14}$ $\frac{28 \pm 16.7}{14}$ 3.19, .807

$20x^2-16x+25= 9x^2-32x+14$

$11x^2+16x+11=0$

$\frac{-16 \pm \sqrt{16^2 - 4(11)(11)}}{22}$ No Roots