

Unit \#1 Day \#6
Solving Quadratic Equations

## Objectives:

- Students will understand how to solve quadratic equations by reverse order of operations, by factoring and using the Zero Product Property and by using the Quadratic Formula.
- Students will be able to choose the most appropriate method for solving a quadratic equation.


## Quadratic Equation:

$$
y=a x^{2}+b x+c
$$

(the highest exponent on $x$ is a 2)

## Forms of Quadratic Equations

1. Standard form

$$
y=a x^{2}+b x+c
$$

2. Factored form

$$
y=c
$$



3.

$y=a(x-h)^{2}+k$

## Three Methods for Solving

1. Reverse Order of Operations
2. Factor and use the Zero Product Property
3. Quadratic Formula

ALWAYS use the MOST EFFICIENT method!

METHOD \#1: Reverse Order of Operations PEMDAS

$$
2 x^{2}-32=12 \quad-3(x-1)^{2}+5=-18
$$

When do we do this?
"X" appears once

METHOD \#2:
Factor and use the Zero Product Property $\downarrow$
GCF, diamonds, boxes

$$
0=x^{2}-5 x \quad 15=x^{2}-2 x
$$

$$
0=2 x^{2}-x-3
$$

When do we do this?

* When you can't Rev. Op
* when factorable

METHOD \#3: Quadratic Formula

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

When do we do this?
only when we have to


EX \#1:
Qeo
(2) $F$

$$
\begin{aligned}
& 3 x^{3}-15 x^{2}=72 x \\
& 3 x^{3}-15 x^{2}-72 x=0 \\
& 3 x\left(x^{2}-5 x-24\right)=0 \\
& 3 x(x-8)(x+3)=0
\end{aligned}
$$

(3) $Q F$
$-8)_{-5}^{-24} 3$

$$
\begin{array}{lll}
3 x=0 & x-8=0 & x+3=0 \\
x=0 & x=8 & x=-3
\end{array}
$$

EX \#2:
(1)RO
(2) $F$

$$
\begin{aligned}
& 3 x^{2}+75=0 \\
& \frac{3 x^{2}}{3}=-\frac{75}{3} \\
& \sqrt{x^{2}}=\sqrt{-25} \\
& x= \pm 5 i
\end{aligned}
$$

(3) $Q F$

EX \#3:

$$
y=a x^{2}+b x+c
$$

今ra
Q8

$$
+2 x^{2}+6 x+3=0
$$

$$
2 x^{2}+6 x+3=0
$$



$$
(-6))^{2}
$$

$$
a=2 \quad b=6 \quad c=3
$$

$$
x=\frac{-6 \pm \sqrt{36-4(2)(3)}}{2(2)}
$$



$$
=\frac{-6 \pm(2 \sqrt{3}}{4}
$$

$$
=\frac{-3 \pm \sqrt{3}}{2} \text { exact }
$$



$$
x \approx-.634,-2.366
$$

EX \#3

EX \#4:
(1)RO
OF
(3) QF

$$
\begin{aligned}
& 3(2 x-1)^{2}+4=31 \\
& 3(2 x-1)^{2}=27 \\
& \sqrt{(2 x-1)^{2}}=\sqrt{9}
\end{aligned}
$$

$$
\begin{aligned}
2 x-1 & =3 \\
2 x & =4 \\
x & =2
\end{aligned}
$$

$$
2 x-1=-3
$$

$$
2 x=-2
$$

$$
x=-1
$$

## EX \#5:

- 

(2) F $14 x=-6 x^{2}+40$
(3) QF
$6 x^{2}+14 x-40=0$
$\frac{2\left(3 x^{2}+7 x-20\right)}{21}=\frac{0}{2}$
$3 x^{2}+7 x-20=0$

$12 \chi_{7}^{-60} \frac{$| $x$ |
| :---: |
| -5 |
| $3 x$ |$\frac{3 x^{2} \mid 12 x}{|-5 x|-20}}{}$

$\begin{array}{lll}1 & 60 \\ 2 & 30\end{array} \quad(3 x-5)(x+4)=0$
320
$3 x-5=0 \quad x+4=0$
$\begin{array}{ll}4 & 15 \\ 5 & 12\end{array}$
$6 \quad 10$
$x=\frac{5}{3}$
$x=-4$

EX \#5



Homework

