## Solving Problems by Factoring

 Polynomials
## Learning Goals

- Solve problems arising from a realistic situation represented by a graph or an equation of a quadratic relation.
- Make connections between the factored form of a quadratic relation and the key features of a parabola.

Minds on...

- What are the key features of a parabola?
- Zeros (x-Intercepts)
- Axis of symmetry
- Vertex $\stackrel{\downarrow}{x}$ coordinate $q$ vertex
- Y-Int $\rightarrow \min _{犬}$ or ma opens up opes down.

Minds on...

- How does factoring help us find the key features of a parabola ?

$$
\begin{aligned}
& \text { Factored Form } \rightarrow \text { Zeros } \\
& \downarrow \\
& A .0 .5 \\
& \downarrow
\end{aligned}
$$ max or min value

## Big Ideas

- The vertex is the maximum or minimum point of a parabola
- The x-intercepts are the zeros, break even points, ... of a parabola
- It is easier to factor an algebraic expression if you first factor out the greatest common factor.


## Example \#1

- For each quadratic relation given below. Express the relation in factored form, determine the zeros, determine the coordinates of the vertex, and sketch the graph of the
$\begin{array}{cc}\text { relation. } & P-8 \\ =y=x^{2}+2 x-8 & 5:+2\end{array} \quad y=(x+4)(x-2) y=-x^{2}-9 x-14$
$\begin{array}{cll}y=(x+4)(x-2) & y=(-1+4)(-1-2) \\ x+4=0 & x-2=0 & y=(3)(-3) \\ x=-4 & x=2 & y=-9\end{array}$
A.O.S. $x=\frac{-4+2}{2} \quad \operatorname{Vertex}(-1,-9)$

$$
x=-1
$$

V

Example \#2

$$
\begin{aligned}
& \text { Pg. } 213 \text { \#15 + determine how long the ball was in the air. } \\
& h=-5 t^{2}+10 t+40 \\
& \left.h=-5\left(t^{2}-2 t-8\right)\right)^{p:-8} \\
& h=-5(t-4 x t+2)^{\prime} \text { os }
\end{aligned}
$$

$$
\begin{aligned}
& h=-5(t-4)(t+2) \\
& h=-5(1-4)(1+2) \\
& h=-5(-3)(3) \\
& h=45 \quad \text { vertex }(1,45)
\end{aligned}
$$

Max height is 45 m .
Ball in ar for $4 s$.

## Example \#3

- Pg. 224 \# 14


## Consolidation

- Identify the type of algebraic expression and the factoring strategies you would use to factor the expression. Factor fully.
- Determine the zeros and the vertex.
- State solution to the given problem.


## Reinforcement

- Page 216 \#11,13
- Page 224 \#14

- Unit Test - Next Wednesday

