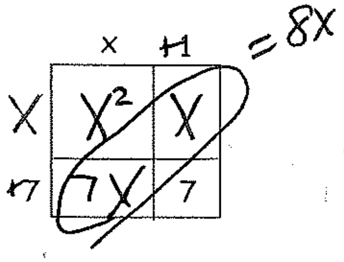
Zero Product Property Day 2

Activity

Name Key

Date 4/10/17 Period Wed

1. a. Complete the area model whose sum is $x^2 + 8x + 7$. A few parts have been labeled to get you started.



b. Write the multiplication expression represented by the area model in factored form. $(X+1)(X+7)$

c. Graph the function $f(x) = x^2 + 8x + 7$ on the graphing calculator. Do you notice any relationship between the x-intercepts on the graph and the factored form of the function? The x-intercept is the opposite of the factor because they must equal zero ($y=0$ for x-intercepts)

d. Predict what values of x will satisfy -solutions this equation: $0 = x^2 + 8x + 7$
(Where can you find this answer on the graphing calculator?)

$X=-1$ and $X=-7$

★ These are the x-intercepts on graph
★ Look in table to find where $y=0$

e. The values of x which make the function equal to zero are called:

Equations
roots
solutions
zeros

⇔

Graph
x-intercepts, because that is where the graph of the function crosses the x-axis.

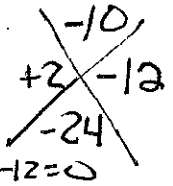
2. A signal flare is fired into the air from an aircraft carrier. The height of the flare in feet t seconds after it is fired is $\boxed{h = -16t^2 + 160t + 384.}$ Write the equation in factored form.

Vertex $(5, 784)$

vertex a. How high will the flare travel? When will it reach this maximum height?

784 feet at 5 seconds

b. Write the equation in factored form. $-16(t^2 - 10t - 24)$
$-16(t+2)(t-12)$



★ Solutions when h=0 c. When will the flare hit the water? Factor 1: $-16 \neq 0$ NO 2) $t+2=0$ ~~$t=-2$~~ NO 3: $t-12=0$ $t=12$ ✓

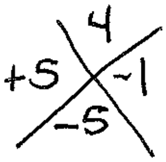
12 seconds

d. Explain how your answers to parts a and c could be found in a table and on a graph of the equation. Use the graphing calculator to verify your answers to parts a and c.

Table: a: find turning point - max - vertex
c: find where $y=0$ (solutions)

Graph: a: find vertex of graph
c: where graph crosses the x-axis

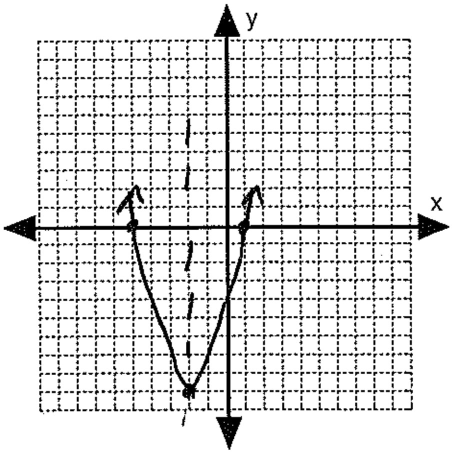
Rewrite each of the following equations in factored form. Sketch the graphs. Find the vertex using $\left(-\frac{b}{2a}, y\right)$.



3. $y = \overset{a}{x^2} + \overset{b}{4x} - \overset{c}{5}$

$\frac{-b}{2a} = \frac{-4}{2(1)} = -2$

$y = (-2)^2 + 4(-2) - 5$
$y = -9$



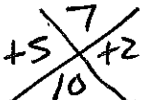
Factored form: $(x+5)(x-1)$

Vertex: $(-2,-9)$

x-intercepts: $(-5,0)$ $(1,0)$

Solutions to $0 = x^2 + 4x - 5$

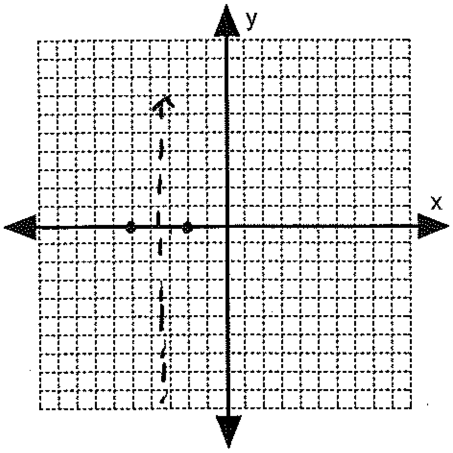
$x = -5$ and $x = 1$



4. $y = x^2 + 7x + 10$

$\frac{-b}{2a} = \frac{-7}{2(1)} = -3.5$

$y = (-3.5)^2 + 7(-3.5) + 10$



Factored form: $(x+5)(x+2)$

Vertex: $(-3.5,$

x-intercepts: $(-5,0)$ $(-2,0)$

Solutions to $0 = x^2 + 7x + 10$

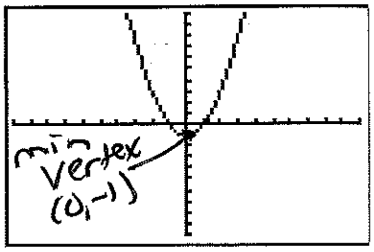
$x = -5$ and $x = -2$

Complete parts a – e for numbers 5 and 6.

a. Write the function in factored/standard form.
b. Name the vertex of the function.
c. Is the vertex a maximum or a minimum point?
d. Write the equation of the axis of symmetry.
e. Name the coordinates of the x–intercepts. where $y = 0$

5. $y = x^2 - 1$

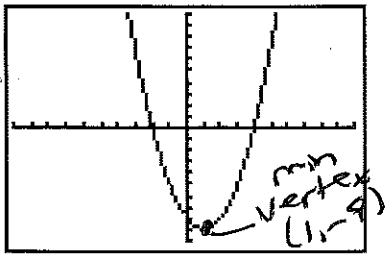
a. $y = (x+1)(x-1)$
b. $(0,-1)$
c. minimum
d. $x = 0$
e. $(-1,0)$ $(1,0)$



$\frac{-b}{2a} = \frac{0}{2(1)} = 0$
$y = 0^2 - 1$
$y = -1$

6. $y = (x+2)(x-4)$

a. $y = x^2 - 2x - 8$
b. $(1,-9)$
c. minimum
d. $x = 1$
e. $(-2,0)$ $(4,0)$



$\frac{-b}{2a} = \frac{2}{2(1)} = 1$
$y = (1)^2 - 2(1) - 8$
$y = -9$