Algebra 1: 12.4 HW **Name** ______________________ **Period** _____

Solving Quadratics by Factoring and Graphing

Factor each polynomial to determine the solution(s) or *x*-intercept(s), if possible. Then, graph the solution(s), the axis of symmetry, and the vertex.

1. $x^2 - 8x = -12$ move

$x^2 - 8x + 12 = 0$

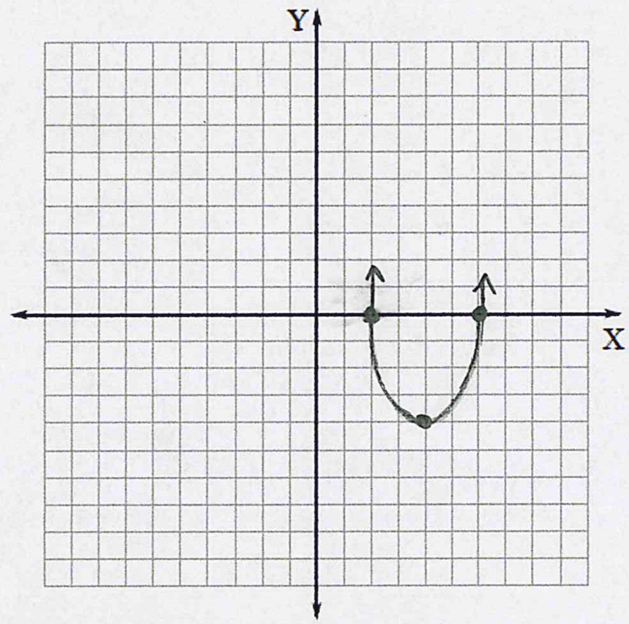
$-2 \cdot -6 = 12$

$-2 + -6 = -8$

$(x-2)(x-6) = 0$

$x - 2 = 0$
$+2 \quad +2$
$\boxed{x = 2}$

$x - 6 = 0$
$+6 \quad +6$
$\boxed{x = 6}$



x-intercept(s): $(2,0)$ and $(6,0)$

axis of symmetry: $x = \frac{2+6}{2} = \frac{8}{2} = 4$

vertex: $(4, -4)$

$x^2 - 8x + 12$, Let $x = 4$

$4^2 - 8(4) + 12 = 16 - 32 + 12 = -4$

2. $x^2 = -9 - 6x$ move

$x^2 + 6x + 9 = 0$

$3 \cdot 3 = 9$

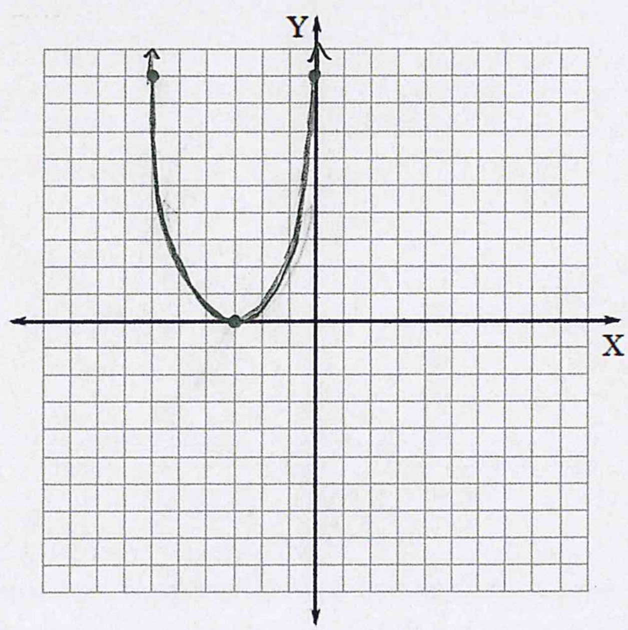
$3 + 3 = 6$

$(x+3)(x+3) = 0$

or

$(x+3)^2 = 0$

$x + 3 = 0$
$-3 \quad -3$
$\boxed{x = -3}$



x-intercept(s): $(-3,0)$

axis of symmetry: $x = -3$

vertex: $(-3,0)$

parabola opens up

$\underline{+1}x^2 + 6x + 9$

↑ positive

3. $\frac{2x^2}{2} - \frac{8}{2} = x^2 - 4$

GCF → $2(x^2 - 4)$

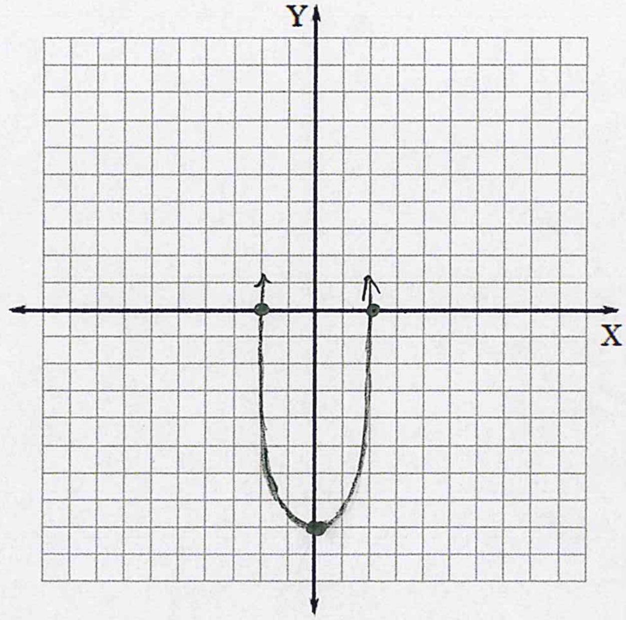
$2 \cdot -2 = -4$

$2 + -2 = 0$

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

$x - 2 = 0$
$+2 \quad +2$
$\boxed{x = 2}$

$x + 2 = 0$
$-2 \quad -2$
$\boxed{x = -2}$



x-intercept(s): (2, 0) and (-2, 0)

axis of symmetry: $x = \frac{2 + (-2)}{2} = \frac{0}{2} = 0$

vertex: (0, -8)

$2x^2 - 8$, Let $x = 0$

$2(0)^2 - 8 = 0 - 8 = -8$

4. $\frac{-2x^2}{-2} - \frac{12x}{-2} - \frac{16}{-2} = x^2 + 6x + 8$

GCF → $-2(x^2 + 6x + 8)$

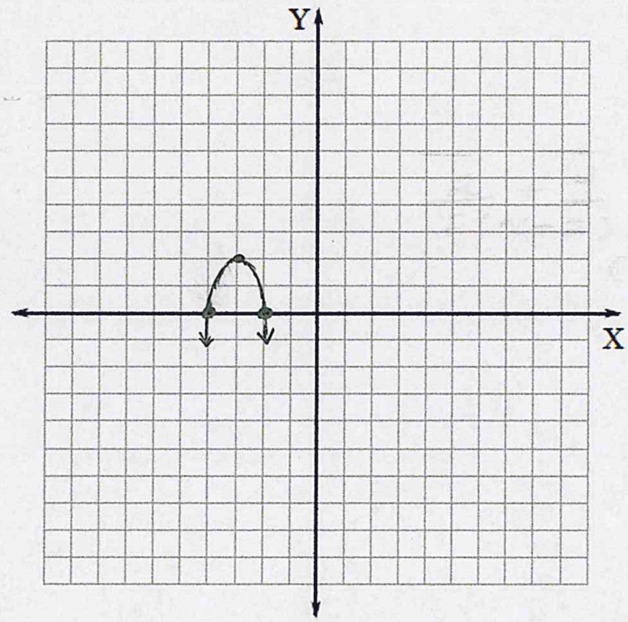
$2 \cdot 4 = 8$

$2 + 4 = 6$

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

$x + 2 = 0$
$-2 \quad -2$
$\boxed{x = -2}$

$x + 4 = 0$
$-4 \quad -4$
$\boxed{x = -4}$



x-intercept(s): (-2, 0), (-4, 0)

axis of symmetry: $x = \frac{-2 + (-4)}{2} = -\frac{6}{2} = -3$

vertex: (-3, 2)

$-2x^2 - 12x - 16$, Let $x = -3$

$-2(-3)^2 - 12(-3) - 16$

$-2(9) + 36 - 16$

$-18 + 36 - 16$

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