College Algebra

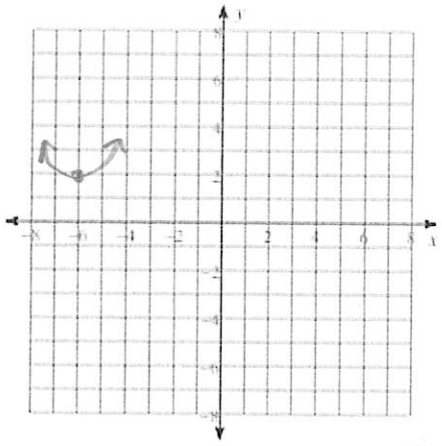
Name Key Hour _____

Worksheet: Graphing Parabolas

9) $y = x^2 + 12x + 38$

y-int

0+0+38



Vertex $(-6, 2)$

Axis of Symmetry $x = -6$

Domain $(-\infty, \infty)$

Range $[2, \infty)$

x-intercept(s) None

y-intercept 38

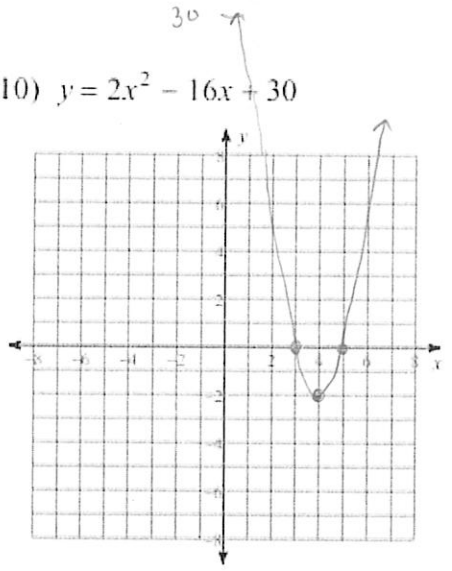
$x = \frac{-b}{2a} = \frac{-12}{2} = -6$

$y = (-6)^2 + 12(-6) + 38$

$= 36 - 72 + 38$

$y = 2$

10) $y = 2x^2 - 16x + 30$



Vertex $(4, -2)$

Axis of Symmetry $x = 4$

Domain $(-\infty, \infty)$

Range $[-2, \infty)$

x-intercept(s) $(5, 0)$ $(3, 0)$

y-intercept $(0, 30)$

$x = \frac{-b}{2a} = \frac{16}{2(2)} = \frac{16}{4} = 4$

$f(4) = y = 2(4^2) - 16(4) + 30$

$= 32 - 64 + 30$

$= -2$

x-int:

$\frac{0}{2} = \frac{2x^2}{2} - \frac{16x}{2} + \frac{30}{2}$

$0 = x^2 - 8x + 15$

15 | -8

-5(-3)

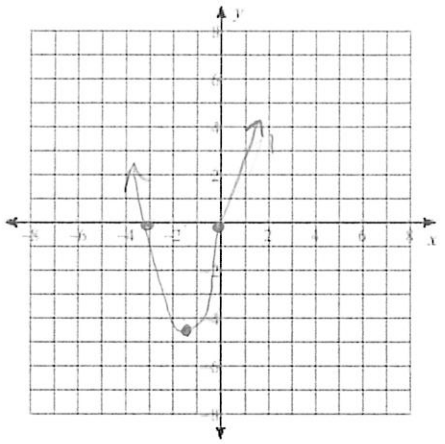
$0 = (x - 5)(x - 3)$

$x = 5 \quad x = 3$

y-int: $y = 0 - 0 + 30$

$y = 30$

11) $y = 2x^2 + 6x$



$-\frac{b}{2a} = \frac{-b}{2(2)} = -\frac{6}{4}$

Vertex $\left(-\frac{3}{2}, -\frac{9}{2}\right)$

Axis of Symmetry $x = -\frac{3}{2}$

Domain $(-\infty, \infty)$

Range $\left[-\frac{9}{2}, \infty\right)$

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

y-intercept $(0,0)$ $y = 0 + 0$

$y = 2\left(-\frac{3}{2}\right)^2 + 6\left(-\frac{3}{2}\right)$

$= 2\left(\frac{9}{4}\right) + \frac{-18}{2}$

$= \frac{9}{2} - \frac{18}{2}$

$= -\frac{9}{2}$

X-int: $0 = 2x^2 + 6x$

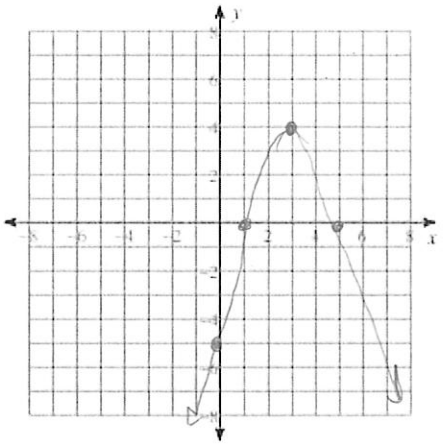
$0 = 2x(x+3)$

$\frac{0}{2} = \frac{2x}{2}$ $\quad 0 = x + 3$

$\quad -3 \quad -3$

$0 = x \quad -3 = x$

12) $y = -x^2 + 6x - 5$



$-\frac{b}{2a} = \frac{-b}{2(-1)} = \frac{6}{-2}$

Vertex $(3, 4)$

Axis of Symmetry $x = 3$

Domain $(-\infty, \infty)$

Range $(-\infty, 4]$

x-intercept(s) $(5,0)$ $(1,0)$

y-intercept $(0, -5)$ $y = 0 + 0 - 5$

$y = -3^2 + 6(3) - 5$

$= -9 + 18 - 5$

$= 4$

X-int: $\frac{0}{-1} = \frac{-x^2}{-1} + \frac{6x}{-1} - \frac{5}{-1}$

$\begin{array}{c|c} 5 & -6 \\ \hline -5(-1) & \end{array}$

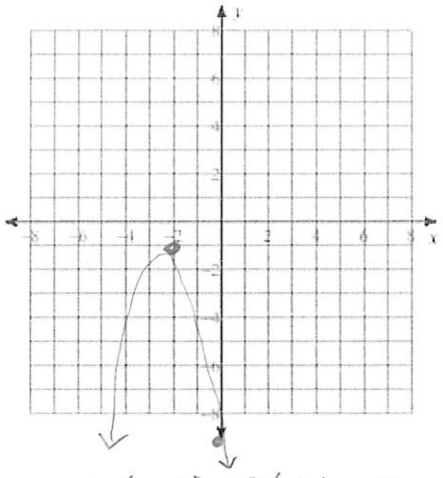
$0 = x^2 - 6x + 5$

$0 = (x-5)(x-1)$

$0 = x - 5 \quad 0 = x - 1$

$x = 5 \quad x = 1$

14) $y = -2x^2 - 8x - 9$



Vertex: $y = -2(-2)^2 - 8(-2) - 9$

$= -2(4) + 16 - 9$

$= -8 + 16 - 9$

$= -1$

Vertex $(-2, -1)$ $\quad \frac{-b}{2a} = \frac{8}{-2(2)} = \frac{8}{-4}$

Axis of Symmetry $x = -2$

Domain $(-\infty, \infty)$

Range $(-\infty, -1]$

x-intercept(s) NONE

y-intercept $(0, -9)$ $\quad y = 0 + 0 - 9$

x-int: $\frac{0}{-1} = \frac{-2x^2}{-1} - \frac{8x}{-1} - \frac{9}{-1}$

$0 = 2x^2 + 8x + 9$

$b^2 - 4ac \quad (8)^2 - 4(2)(9)$

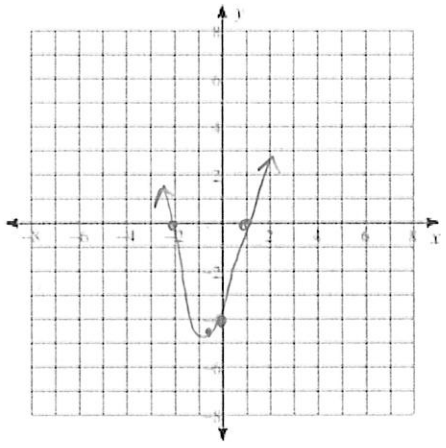
$64 - 72$

-8

No Real x-intercept

18 | 8

15) $y = 2x^2 + 2x - 4$



Vertex: $2\left(-\frac{1}{2}\right)^2 + 2\left(-\frac{1}{2}\right) - 4$

$2\left(\frac{1}{4}\right) + -1 - 4$

$\frac{1}{2} - 5$

$\frac{1}{2} - \frac{10}{2} = -\frac{9}{2}$

Vertex $\left(-\frac{1}{2}, -\frac{9}{2}\right)$ $\quad \frac{-b}{2a} = \frac{-2}{2(2)} = -\frac{1}{2}$

Axis of Symmetry $x = -\frac{1}{2}$

Domain $(-\infty, \infty)$

Range $\left[-\frac{9}{2}, \infty\right)$

x-intercept(s) $(-2, 0)$ $(1, 0)$

y-intercept $(0, -4)$ $\quad y = 0 + 0 - 4$

$\frac{0}{2} = \frac{2x^2}{2} + \frac{2x}{2} - \frac{4}{2}$

$0 = x^2 + x - 2$

$0 = (x + 2)(x - 1)$

$x + 2 = 0 \quad x - 1 = 0$

$x = -2 \quad x = 1$

$-2 \mid 1$

$2(-1)$