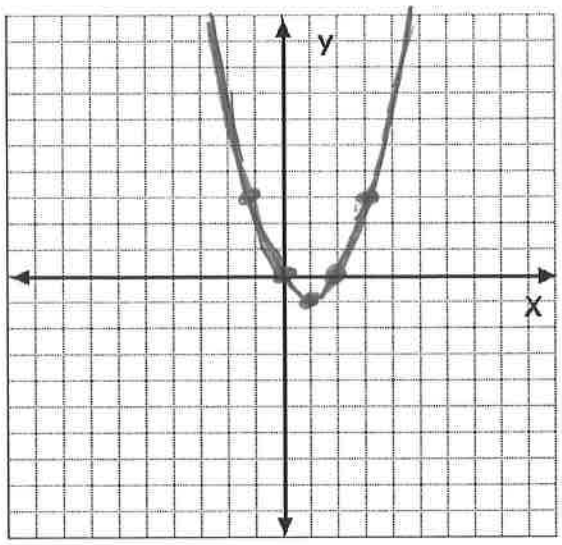
Algebra 2/Trig
5-1 Graphing Quadratics

Name Answer Key
Date _____ Block _____

STANDARD FORM #1: $y = x^2 - 2x$



a) Find the vertex.

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

b) Write the equation for the axis of symmetry.

$X = 1$

c) Complete a table of values.

X	y
1	-1
0	0
2	0
3	3

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

$3^2 - 2(3) = 3$

(-1, 3)

d) Find the y-intercept.

(0, 0)

e) Find the x-intercepts.

(0,0), (2,0)

Factor: $X(X-2) = 0$

$X = 0 \quad X - 2 = 0$

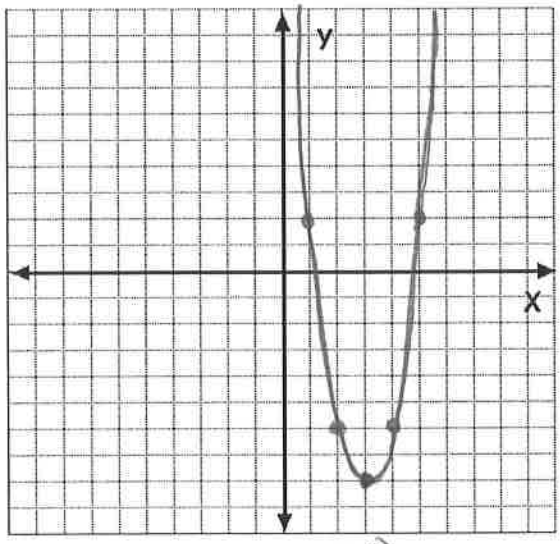
$\{0, 2\}$

Quad. Form.: $\frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(0)}}{2(1)}$

$= \frac{2 + \sqrt{4}}{2} = \frac{2+2}{2} = 2$

$= \frac{2-2}{2} = 0$

STANDARD FORM #2: $f(x) = 2x^2 - 12x + 10$



a) Find the vertex.

$\frac{-(-12)}{2(2)} = \frac{12}{4} = (3, -8)$ $2(3)^2 - 12(3) + 10$ $18 - 36 + 10$

b) Write the equation for the axis of symmetry.

$X = 3$

c) Complete a table of values.

X	Y
3	-8
2	-6
1	2
0	10
4	-6
5	2

$2(2)^2 - 12(2) + 10 = 8 - 24 + 10 = -6$

$2(1)^2 - 12(1) + 10 = 2$

d) Find the y-intercept.

(0, 10)

e) Find the roots.

Quad. Form.: $\frac{12 \pm \sqrt{12^2 - 4(2)(10)}}{4}$

$\frac{12 \pm \sqrt{144 - 80}}{4}$

$\frac{12 \pm \sqrt{64}}{4}$

$\frac{12+8}{4} = 5 \quad \frac{12-8}{4} = 1$

Factor: 20

$-10 \quad -2 \quad -12$

$2x^2 - 2x \quad -10x + 10$

$2x(x-1) - 10(x-1)$

$(2x-10)(x-1)$

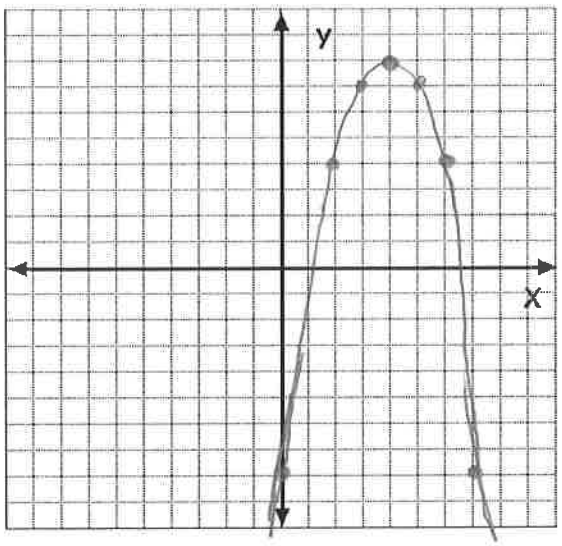
$2x - 10 = 0$

$X = 5$

$X - 1 = 0$

$X = 1$

STANDARD FORM #3: $y = -x^2 + 8x - 8$



a) Find the vertex.

$\frac{-8}{2(-1)} = (4, 8)$ $\quad y = -(4)^2 + 8(4) - 8$

$y = -16 + 32 - 8 = 8$

b) Write the equation for the axis of symmetry.

$X = 4$

c) Complete a table of values.

X	Y
4	8
3	7
5	7
2	4
6	4

$-(3)^2 + 8(3) - 8$

$-9 + 24 - 8 = 7$

$-(2)^2 + 8(2) - 8$

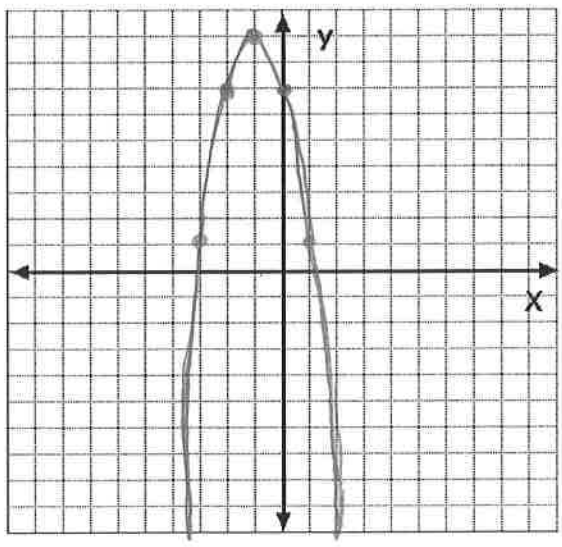
$-4 + 16 - 8 = 4$

d) Find the y-intercept.

$(0, -8)$

e) Find the zeros. Quad. Form.: $\frac{-8 \pm \sqrt{8^2 - 4(-1)(-8)}}{2(-1)} = \frac{-8 \pm \sqrt{64 - 32}}{-2} = \frac{-8 \pm \sqrt{32}}{-2} = \frac{-8 \pm \sqrt{16}\sqrt{2}}{-2} = \frac{-8 \pm 4\sqrt{2}}{-2} = \boxed{4 \pm 2\sqrt{2}}$

STANDARD FORM #4: $f(x) = -2x^2 - 4x + 7$



a) Find the vertex.

$\frac{4}{2(-2)} = (-1, 9)$ $\quad -2(-1)^2 - 4(-1) + 7$

$-2 + 4 + 7 = 9$

b) Write the equation for the axis of symmetry.

$\boxed{X = -1}$

c) Complete a table of values.

X	Y
-1	9
0	7
1	1
-2	7
-3	1

$-2(1)^2 - 4(1) + 7$

$-2 - 4 + 7 = 1$

d) Find the y-intercept.

$(0, 7)$

e) Find the x-intercepts.

$(-3.12, 0)$ $(1.12, 0)$

Quad Form: $\frac{4 \pm \sqrt{(-4)^2 - 4(2)(7)}}{2(-2)} = \frac{4 \pm \sqrt{16 + 56}}{-4} = \frac{4 \pm \sqrt{72}}{-4} = \frac{4 \pm \sqrt{36}\sqrt{2}}{-4} = \frac{4 \pm 6\sqrt{2}}{-4} = \boxed{\frac{2 \pm 3\sqrt{2}}{-2}}$