Name: Key Date: _____ Period: _____

2.2 Characteristics of Quadratics DAY ONE CYU

☑ *Use when you get it right all by yourself*

S *Use when you did it all by yourself, but made a silly mistake*

H *Use when you could do it alone with a little help from teacher or peer*

G *Use when you completed the problem in a group*

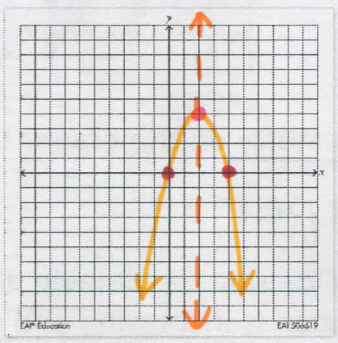
X *Use when a question was attempted but wrong (get help)*

N *Use when a question was not even attempted*

CONCEPTS	BASIC	INTERMEDIATE	ADVANCED
Graphing Quadratics	1	1	1, 2, 3
Vertex	1	1	1, 3
Axis of Symmetry	1	1	1, 2, 3
Minimum/Maximum Value		4, 5	
Increasing/Decreasing		5	4
Domain/Range		4	
x-intercept(s)	1	1	1

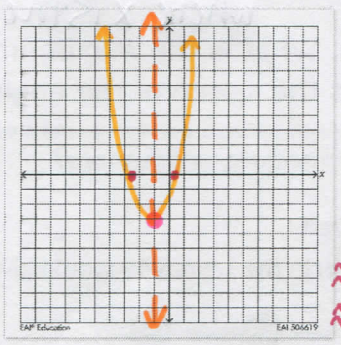
1. Graph the function. Label the x-intercept(s), vertex, and axis of symmetry on the graph.

a. $y = -(x - 2)^2 + 4$



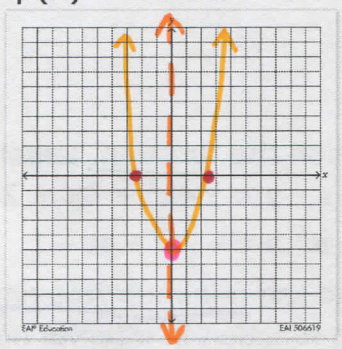
(2, 4)
x = 2
down
(0, 0)
(4, 0)

b. $g(x) = 2(x + 1)^2 - 3$



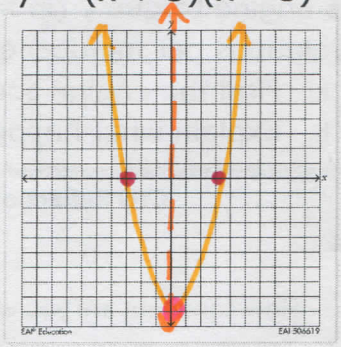
(-1, -3)
x = -1
up
$(-1 \pm \sqrt{\frac{3}{2}}, 0)$
$\approx (-2.225, 0)$
$\approx (0.225, 0)$

c. $p(x) = 0.75x^2 - 5$



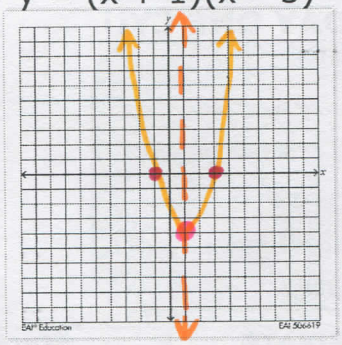
(0, -5)
x = 0
up
$(\pm\sqrt{\frac{20}{3}}, 0)$
$\approx (\pm 2.582, 0)$

d. $y = (x + 3)(x - 3)$



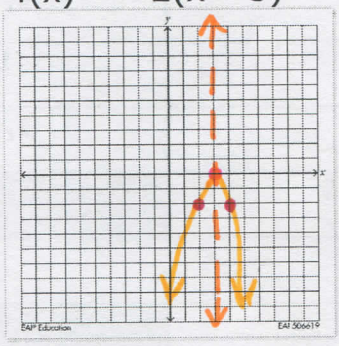
(0, -9)
x = 0
up
(3, 0)
(-3, 0)

e. $y = (x + 1)(x - 3)$



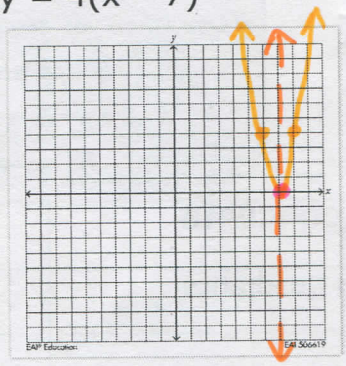
(1, -4)
x = 1
up
(3, 0)
(-1, 0)

f. $f(x) = -2(x - 3)^2$



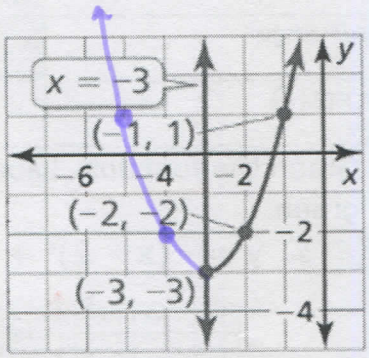
(3, 0)
x = 3
down
(2, -2)
(4, -2)

g. $y = 4(x - 7)^2$



(7, 0)
x = 7
up
(7, 0)

2. Use the axis of symmetry to plot the reflection of each point and complete the parabola.



3. Graph the function. Label the vertex and axis of symmetry on the graph.
   a. $y = -4x^2 + 8x + 2$
   b. $y = -\frac{5}{2}x^2 - 4x - 1$

extra paper

4. Find the minimum/maximum value of the function. Describe the domain and range of the function in interval notation, and where the function is increasing and decreasing.
   a. $y = 6x^2 - 1$
   b. $y = 9x^2 + 7$

extra paper

5. The engine torque y (in foot-pounds) of one model of car is given by $y = -3.75x^2 + 23.2x + 38.8$ (in thousands of revolutions per minute) of the engine.
   a. Find the engine speed that maximizes torque. What is the maximum torque?
   b. Explain what happens to the engine torque as the speed of the engine increases.

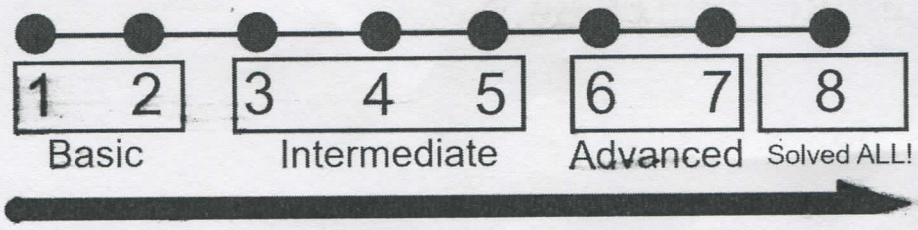
where x is the speed

extra paper

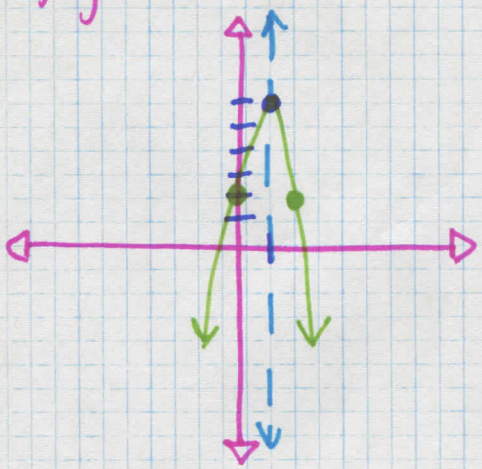
CYU Reflection: *How far can you go: basic, intermediate, or advanced?*

Rate your mastery level!

How confident are you with the skills this CYU covered? Circle the score you would give yourself.

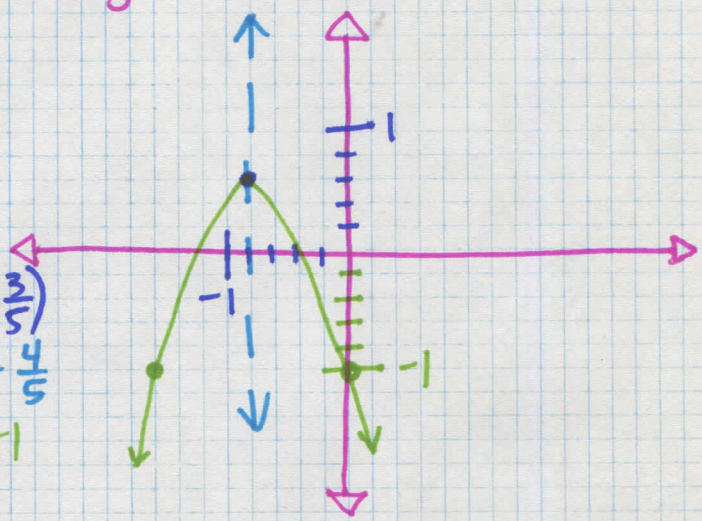


3. a) $y = -4x^2 + 8x + 2$



(1, 6)
$x = 1$
$c = 2$

3b) $y = -\frac{5}{2}x^2 - 4x - 1$



$(-\frac{4}{5}, \frac{3}{5})$
$x = -\frac{4}{5}$
$c = -1$

4 a) V: $(0, -1)$
max value: -1
D: $(-\infty, \infty)$
R: $(-\infty, -1]$

I: $(-\infty, 0)$
D: $(0, \infty)$

4b) V: $(0, 7)$
min value: 7
D: $(-\infty, \infty)$
R: $[7, \infty)$

I: $(0, \infty)$
D: $(-\infty, 0)$

5a) V: (3.093, 74.683)
$\approx$ 74.683 ft-lbs
$\approx$ 3,093 rev/min

b) As the torque increases, the speed increases. When speed reaches 3.093 thousands then it begins to decrease.