Section 2.2: Graphing Quadratic Equations

For each Quadratic Equation below,

A) Determine the orientation of the graph (direction of opening)
B) Find the vertex and determine whether the vertex is a maximum or minimum
C) Create a table of values (put the vertex in the middle and take two points to the left of the vertex and two points to the right of the vertex).
D) Graph the function with its base function $y = x^2$. As well, draw the axis of symmetry for each function on the graph and state its equation. A.O.S. $x =$ x-coordinate of the vertex
E) Complete the statement indicated.
F) Find the domain and range.
G) Determine whether the graph is wider or narrower that the base graph $y = x^2$.

i) $y = 2x^2 - 4x + 3$

A) Orientation up (b/c a is +) ∪

B) Vertex and Type minimum

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

$x = \frac{4}{2(2)} = \frac{4}{4} = 1$

$y = 2x^2 - 4x + 3$
$y = 2(1)^2 - 4(1) + 3$
$y = 2(1) - 4 + 3$
$y = 2 - 4 + 3$
$y = 1$

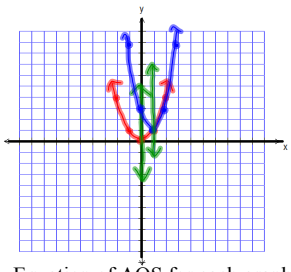
(1, 1)

C) Table of Values

i) ii)

x	$y = x^2$	x	$y = 2x^2 - 4x + 3$
-2	4	-1	9
-1	1	0	3
0	0	(1)	1
1	1	2	3
2	4	3	9

D) Graph



Equation of AOS for each graph

i) $x = 0$ ii) $x = 1$

E) y has a minimum value of y = 1 and it occurs at x = 1

Vertex minimum (1, 1)
When the min/max occurs. → minimum/maximum value of y

F) Domain

$\{x \mid x \in R\}$

The domain is "the set of all numbers 'x' such that x belongs to the real numbers".

Ans: $\{x \mid x \in R\}$ or The set of all real numbers.

Range

Vertex – minimum – (1, 1) ← this is the lowest value of y

$\{y \mid y \geq 1, y \in R\}$

The range is the set of all numbers greater than or equal to 1.

G) narrower.

if "a" is a number greater than 1 or less than −1, the graph is narrower

$y = ax^2 + bx + c$

−2, −3... or 2, 3, 4...

ii) $y = -3x^2 + 6x$

A) Orientation down (a is negative) ∩

B) Vertex and Type maximum

$x = \frac{-b}{2a} = \frac{-6}{2(-3)} = \frac{-6}{-6} = 1$

$y = -3(1)^2 + 6(1)$

$y = -3(1) + 6$

$y = 3$

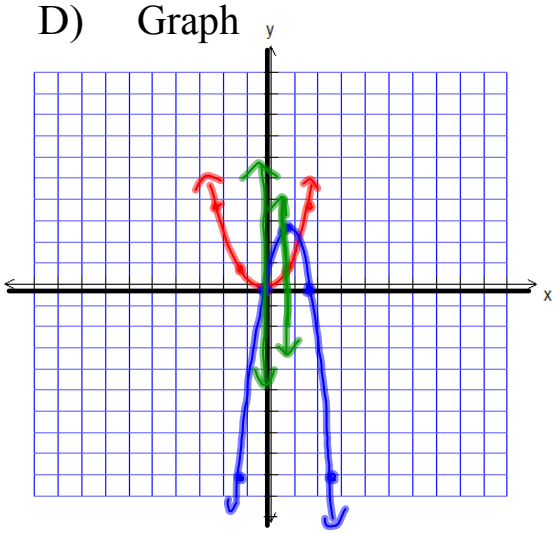
(1,3)

C) Table of Values

Base →

x	$y = x^2$	x	$y = -3x^2 + 6x$
-2	4	-1	-9
-1	1	0	0
0	0	1	3
1	1	2	0
2	4	3	-9

D) Graph



(x, y) → max/min value of y.
When it occurs

Equation of AOS for each graph

i) x = 0 ii) x = 1

E) y has a maximum value of y = 3 and it occurs at x = 1

F) Domain $\{x \mid x \in R\}$

Range $\{y \mid y \leq 3, y \in R\}$

G) narrower (b/c $a < -1$)

iii) $y = -0.5x^2 - 4$

$y = ax^2 + bx + c$

A) Orientation down ∩

B) Vertex and Type maximum

$x = \frac{-b}{2a} = \frac{0}{2(-0.5)}$

$x = 0$

$y = -0.5(0)^2 - 4$

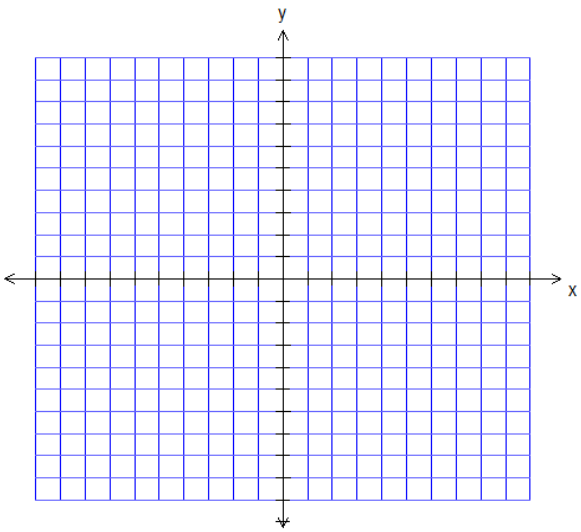
$y = 0 - 4$

$y = -4$

C) Table of Values

x	$y = x^2$	x	$y = -0.5x^2 - 4$
-2	4	-2	-6
-1	1	-1	-4.5
0	0	0	-4
1	1	1	-4.5
2	4	2	-6

D) Graph



Equation of AOS for each graph

E) y has a _____value of y = ____ and it occurs at x = ___

F) Domain Range

G)