

Starter 10 JAN 2019  
 Given the quadratic equation  $y = -2x^2 + 4$ ,  
 determine if the graph opens up or down and if  
 it has a minimum or maximum point. Do not use  
 the calculator.

Down  
 MAXIMUM

Changing the value of the constant "C"

a.)  $f(x) = x^2$  (the **parent function**)

b.)  $y = x^2 + 3$       c.)  $y = x^2 - 4$

x	y
-2	7
-1	4
0	3
1	4
2	7

x	y
-2	0
-1	-3
0	-4
1	-3
2	0

d.)  $y = x^2 - 5$

x	y
-2	-1
-1	-4
0	-5
1	-4
2	-1

x	y
-2	4
-1	1
0	0
1	1
2	4

Effects of changing the constant: **C** parabola shift up or down

$$y = ax^2 + c$$

$$y = 3x^2 + 4$$

$$y = -\frac{1}{2}x^2 + 3$$

**AOS** the line of (vertical) reflecting

Vertex: the min. or max. pt.

- If parabola opens UPWARD, the VERTEX is the **minimum** point or lowest point
- If parabola opens DOWNWARD, the VERTEX is the **maximum** point or highest point.

a) Minimum Point:  $(-6, -7)$  AOS  $x = -6$  Vertex

b) Maximum Point:  $(4, 5)$  AOS  $x = 4$  Vertex

graph a has  $y$  minimum of  $-7$

graph a has a minimum at  $-6$   $x$

Ex 2: Tell whether each parabola opens up or down and whether the vertex is a maximum or minimum

a.  $y = 4x^2$

Up  
MIN

b.  $y = -3x^2 + 2$

Down  
MAX

c.  $y = 2x^2 - 4x + 1$

$y = -x^2 + 2x$

Down  
MAX

