

SECTION 1.2  
QUADRATIC FUNCTIONS

$$y = a(x - p)^2 + q$$

- i) Completing the square
- ii) Graphing  $y = a(x - p)^2 + q$
- iii) Using a, p, q to find vertex, opens up, down, congruency factor.
- iv) Deriving and using the quadratic function

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D) GRAPHING QF:  $y = a(x - p)^2 + q$

- o A Quadratic function in standard form is much
- o Using constants "a", "p", & "q", we can find

- Vertex:                      Axis of Symmetry:
- Domain:                      Range:
- Y intercept:
- X-intercept:



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EX: FOR EACH OF FOLLOWING EQUATIONS, FIND THE CONSTANTS "A", "P", "Q", VERTEX, AND A.O.S.

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

ii)  $y = \frac{-1}{2}(x + 4)^2 - 11$

iii)  $y = 3(2x - 4)^2$



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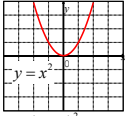
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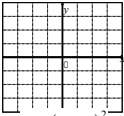
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II) CONSTANTS "P" AND "Q"

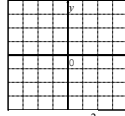
- The constant "p" affects the
- When  $p=0$ , the graph is



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

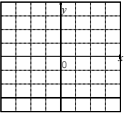


$$y = (x-2)^2$$

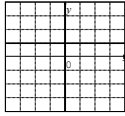


$$y = (x+2)^2$$

- The constant "q" affects the graph vertically



$$y = x^2 + 2$$



$$y = x^2 - 3$$



Interactive Applet

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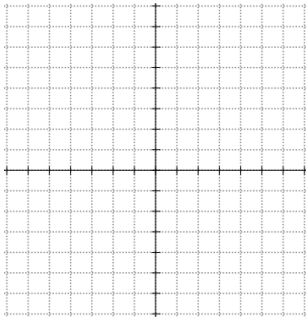
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GRAPH:  $y = x^2$        $y = (x-3)^2 - 4$




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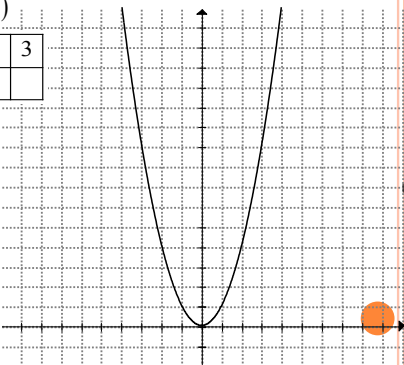
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III) HOW DOES THE CONSTANT "A" WORK?

$$y = x^2 \quad (a=1)$$

x	0	1	2	3
y				




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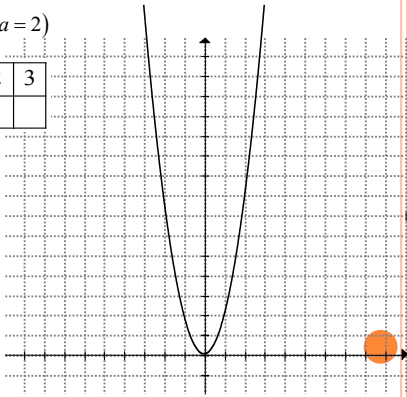
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$$y = 2x^2 \quad (a=2)$$

x	0	1	2	3
y				




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#### IV) CONSTANT "A" (CONGRUENCY FACTOR)

- The constant "a" determines the (congruency) width of the parabola and which way it opens
  - If "a" is positive
  - If "a" is negative
  - If "a" is big
  - If "a" is small
- Congruency Factor:
  - The constant "a" can be used to




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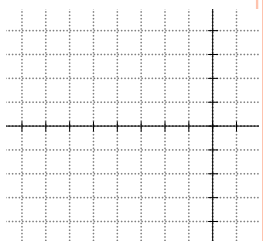
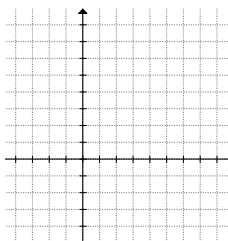
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PRACTICE: GRAPH THE FOLLOWING PARABOLAS AND INDICATE THE VERTEX, AOS, DOMAIN & RANGE

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

$$y = -0.5(x+3)^2 + 4$$




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VI) CTS: COMPLETE THE SQUARE!

- Completing the Square is a process that changes a

General form:



Standard Form:



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PRACTICE: CONVERT THE FOLLOWING TO STANDARD FORM

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



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