

COLLEGE ALGEBRA

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GPS # 12

2.1 QUADRATIC FUNCTIONS; PARABOLAS II

Class Time: 11:30 A.M Date: 1/21/08

Useful Guidelines:

- * $f(x) = x^2 + k$: A parabola with the same shape as the graph of $f(x) = x^2$. The parabola is shifted vertically k units up if $k > 0$ or k units down if $k < 0$; Vertex: $(0, k)$.
- * $f(x) = (x - h)^2$: A parabola with the same shape as the graph of $f(x) = x^2$. The parabola is shifted horizontally h units to the right if $h > 0$ or h units to the left if $h < 0$; Vertex: $(h, 0)$.
- * $f(x) = a(x - h)^2 + k$: The parabola is open upward if $a > 0$ or open downward if $a < 0$. The axis of symmetry is $x = h$; Vertex: (h, k) .

20/20
Guided
nb!

Graph each parabola. Plot at least two points in addition to the vertex. Give the vertex, axis, domain, and range.

1. a) $f(x) = x^2 + 5$ Vertex: $(0, 5)$
 axis: $x = 0$
 D: $(-\infty, \infty)$
 R: $[5, \infty)$

b) $f(x) = x^2 - 8$ vertex: $(0, -8)$
 axis: $x = 0$
 D: $(-\infty, \infty)$
 R: $[-8, \infty)$
 so next!

2. a) $f(x) = -x^2 + 3$ vertex: $(0, 3)$
 axis: $x = 0$
 D: $(-\infty, \infty)$
 R: $(-\infty, 3]$

b) $f(x) = -2x^2 - 7$ vertex: $(0, -7)$
 axis: $x = 0$
 D: $(-\infty, \infty)$
 R: $(-\infty, -7]$

3. a) $f(x) = (x - 7)^2$ vertex: $(7, 0)$
 axis: $x = 7$
 D: $(-\infty, \infty)$
 R: $[0, \infty)$

$(x - 7)(x - 7)$
 $x^2 - 14x + 49$

b) $f(x) = -2(x + 1)^2$ vertex: $(-1, 0)$
 axis: $x = -1$
 D: $(-\infty, \infty)$
 R: $(-\infty, 0]$

4. a) $f(x) = (x - 3)^2 + 2$ vertex: $(3, 2)$
 axis: $x = 3$
 D: $(-\infty, \infty)$
 R: $[2, \infty)$

b) $f(x) = 3(x - 1)^2 - 1$ vertex: $(1, -1)$
 axis: $x = 1$
 D: $(-\infty, \infty)$
 R: $[-1, \infty)$