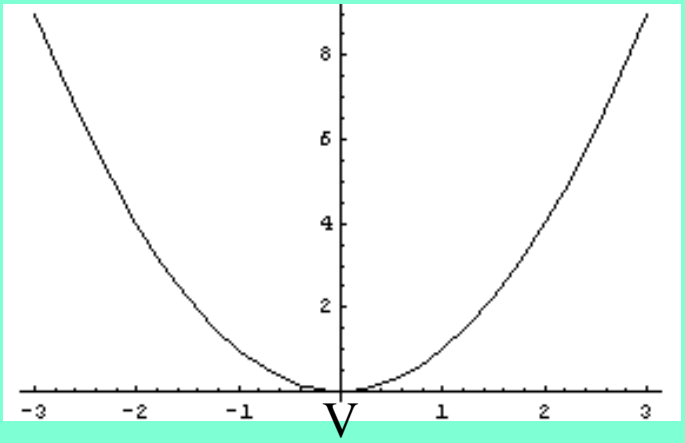
Kvadratická funkce

je každá funkce určená předpisem $y = ax^2 + bx + c,\ a \neq 0$

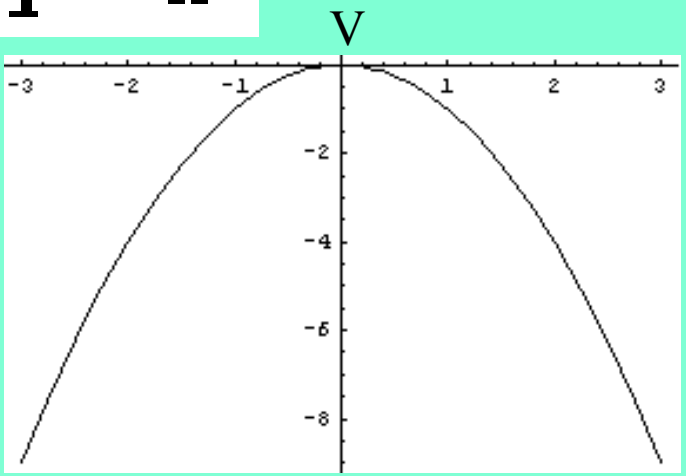
Grafem kvadratické funkce je parabola

$y = x^2$



$a > 0$ konvexní parabola
V- minimum

$y = -x^2$



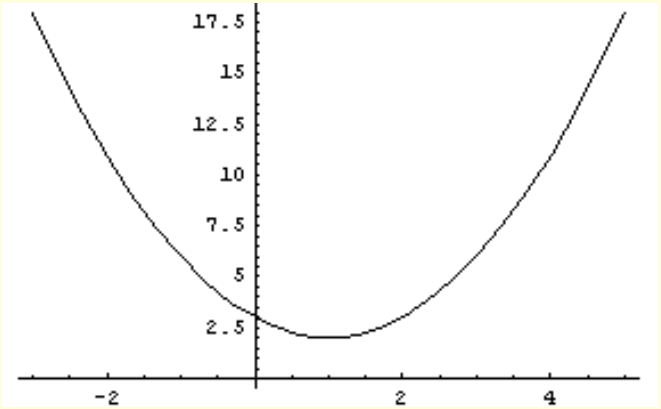
$a < 0$ konkávní parabola
V- maximum

V: vrchol paraboly $V = \left[\frac{-b}{2a}, c - \frac{b^2}{4a} \right]$

1) Napište funkční předpis kvadratické funkce, která prochází danými body, sestrojte graf funkce:

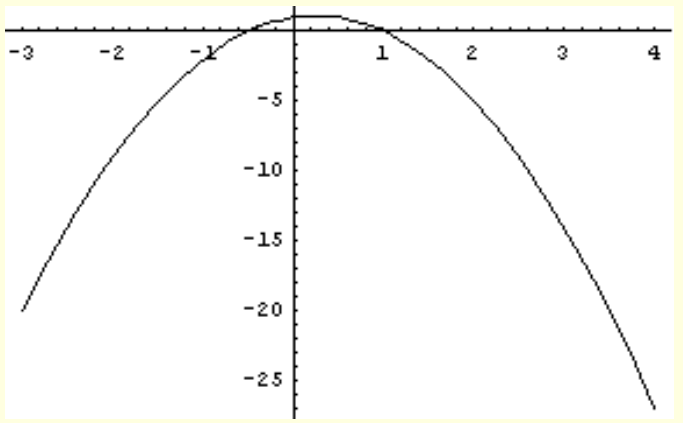
$A = [0, 3],\ B = [1, 2],\ C = [-2, 3]$

řešení: $y = x^2 - 2x + 3$



$A = [1, 0],\ B = [-2, -9],\ C = [-1, -2]$

řešení: $y = -2x^2 + x + 1$



2) Napište funkční předpis kvadratické funkce, když platí:

f(1)=-2, f(2)=4, f(3)=4

řešení: $y = -3x^2 + 15x - 14$

3) Sestrojte grafy funkcí:

$f_1 : y = x^2 + 4x + 3$

$f_2 : y = x^2 - 3x$

$f_3 : y = 2x^2 - 6$

$f_4 : y = \frac{1}{2}x^2 - 2$

$f_5 : y = -x^2 + 4x - 1$

$f_6 : y = -2x^2 + 4x + 1$

$f_7 : y = -2x^2 + 6x$

$f_8 : y = \frac{-1}{2}x^2 + 3$

$f_9 : y = \frac{-1}{2}x^2 + 3x, \; x \in \langle -2, 1 \rangle$

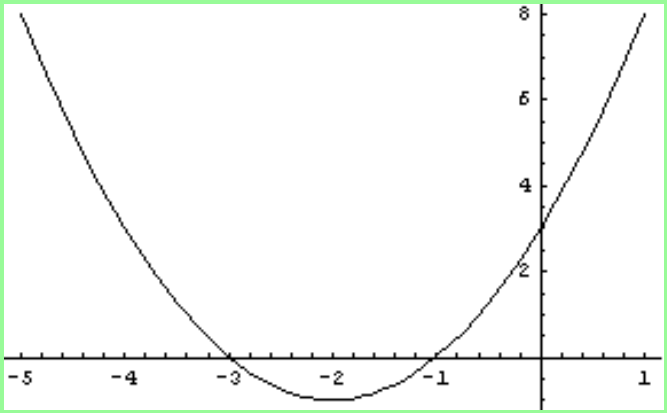
$f_{10} : y = 2x^2 - 4x, \; x \in \langle -1, 3 \rangle$

$f_{11} : y = -2x^2 + 3, \; x \in \langle -1; 0,5 \rangle$

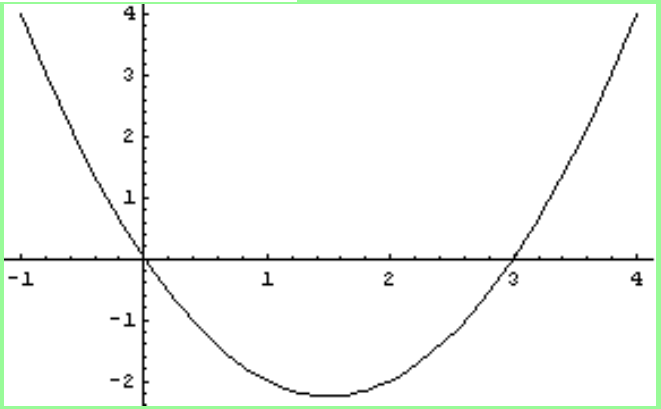
$f_{12} : y = -x^2 + 4x + 2, \; x \in \langle -1; 2,5 \rangle$

Výsledky:

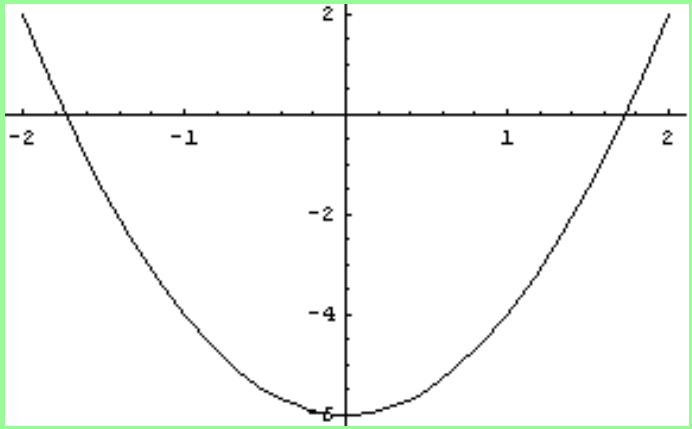
$f_1 : y = x^2 + 4x + 3$



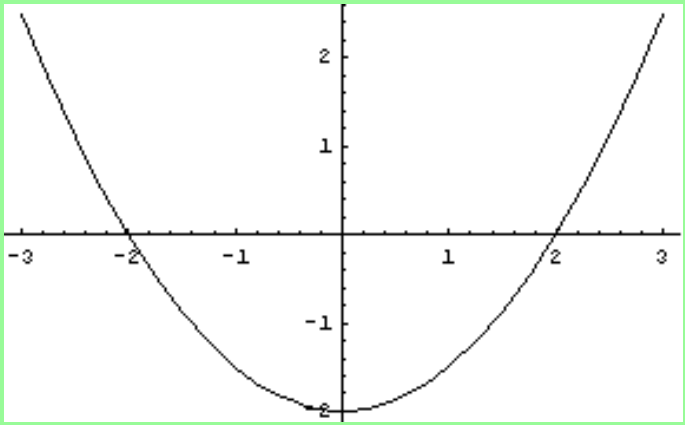
$f_2 : y = x^2 - 3x$



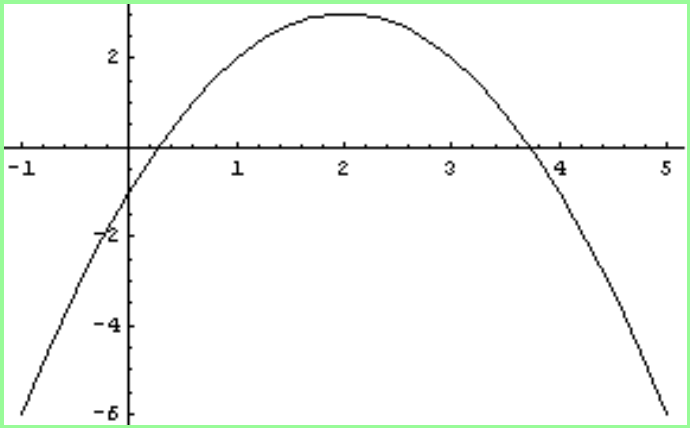
$f_3 : y = 2x^2 - 6$



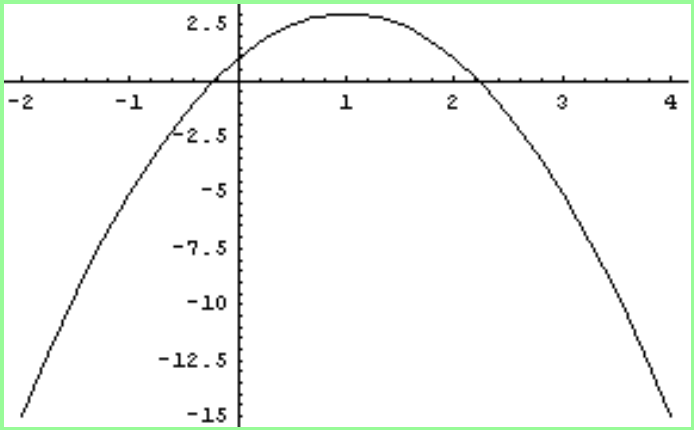
$f_4 : y = \frac{1}{2}x^2 - 2$



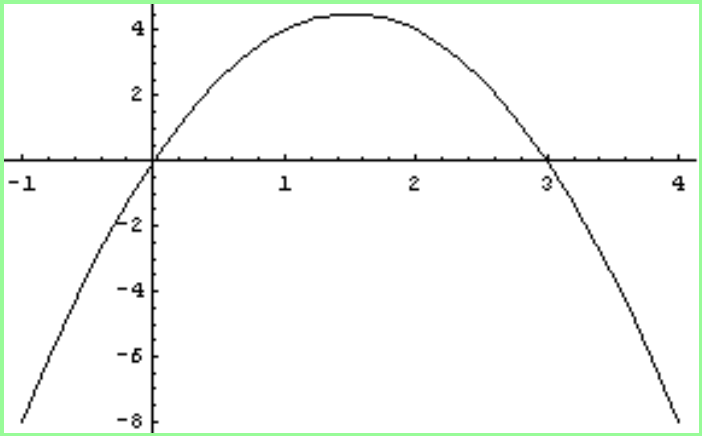
$f_5 : y = -x^2 + 4x - 1$



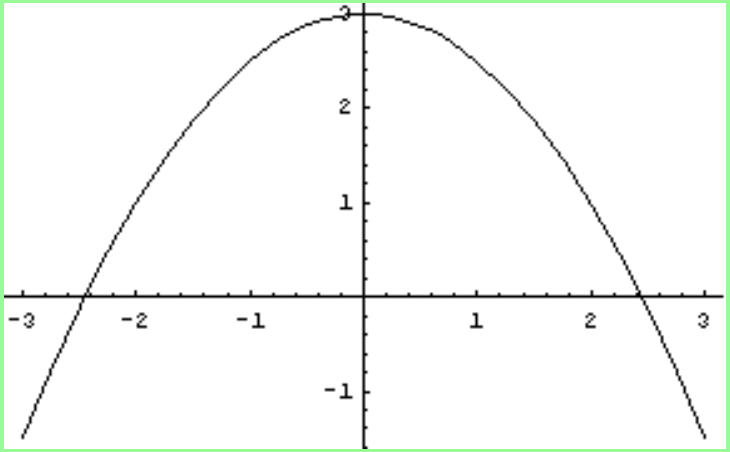
$f_6 : y = -2x^2 + 4x + 1$



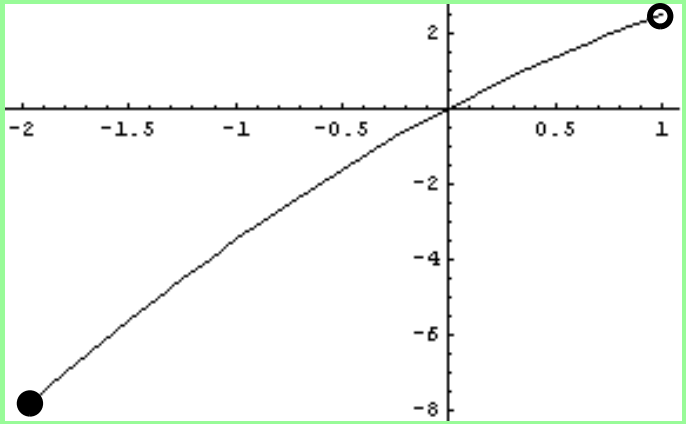
$f_7 : y = -2x^2 + 6x$



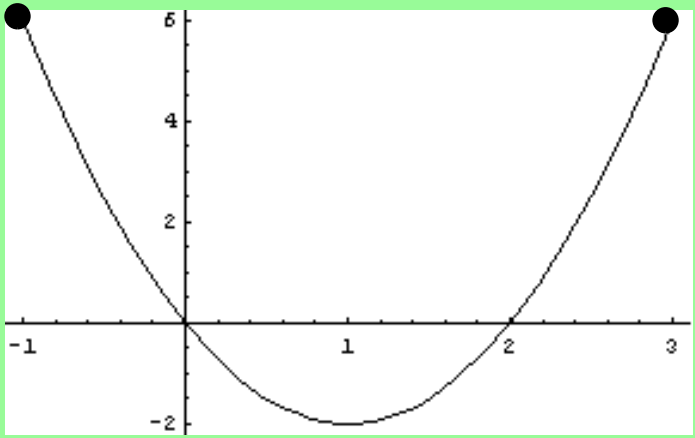
$f_8 : y = \frac{-1}{2}x^2 + 3$



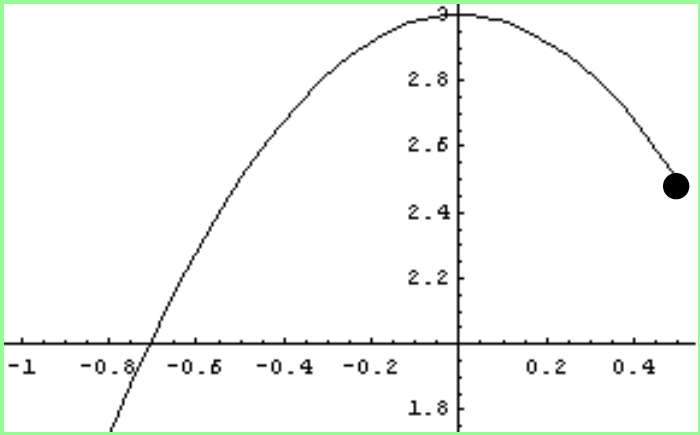
$f_9 : y = \frac{-1}{2} x^2 + 3x, \; x \in \langle -2, 1)$



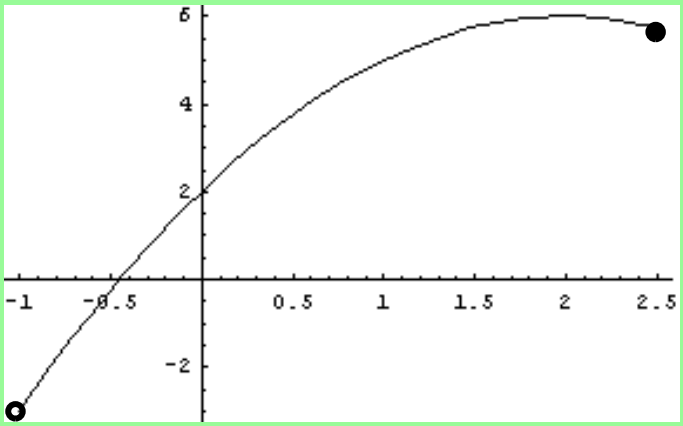
$f_{10} : y = 2x^2 - 4x, \; x \in \langle -1, 3\rangle$



$f_{11} : y = -2x^2 + 3, \; x \in (-1; 0,5\rangle$



$f_{12} : y = -x^2 + 4x + 2, \; x \in (-1; 2, 5\rangle$



4) Sestrojte grafy funkcí:

$g_1 : y = |x^2 + 2x|$

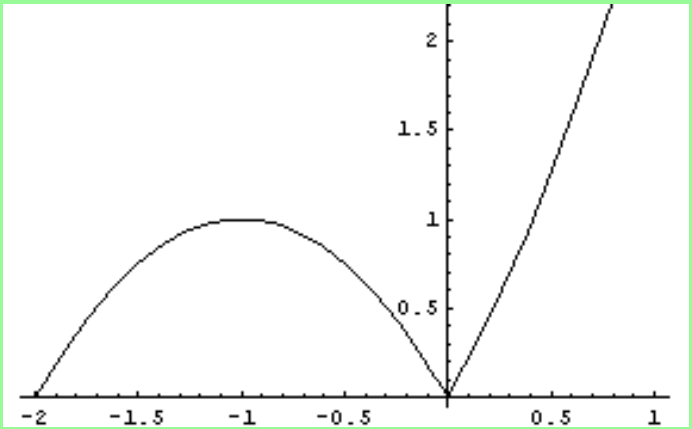
$g_2 : y = |x^2 + 2x - 3|$

$g_3 : y = x^2 - 3|x|$

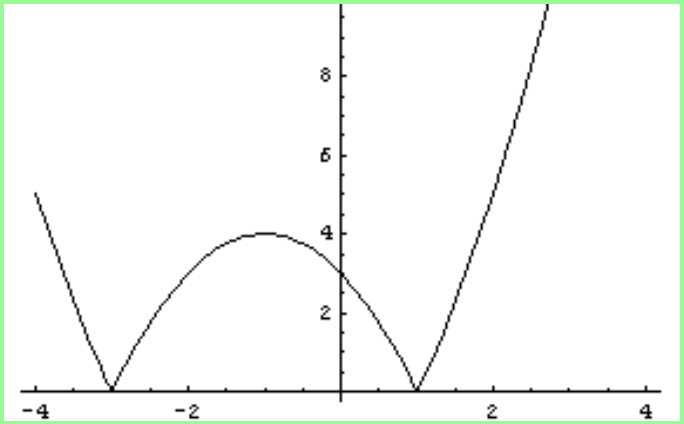
$g_4 : y = x|x - 3|$

Výsledky:

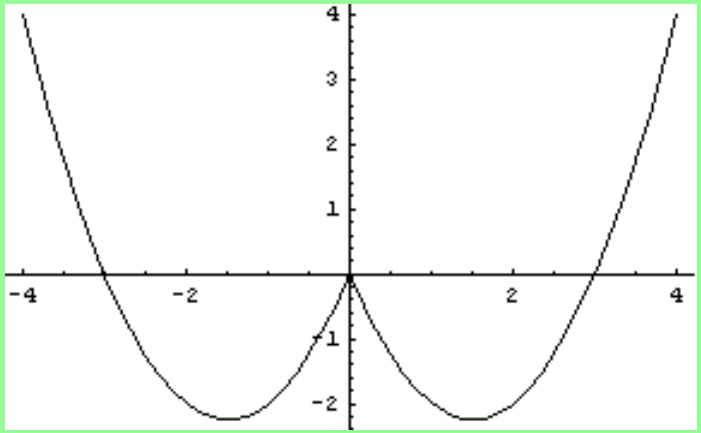
$g_1 : y = |x^2 + 2x|$



$g_2 : y = |x^2 + 2x - 3|$



$g_3 : y = x^2 - 3|x|$



$g_4 : y = x|x - 3|$