

Estude o sinal de cada uma das seguintes funções:

Fórmula:

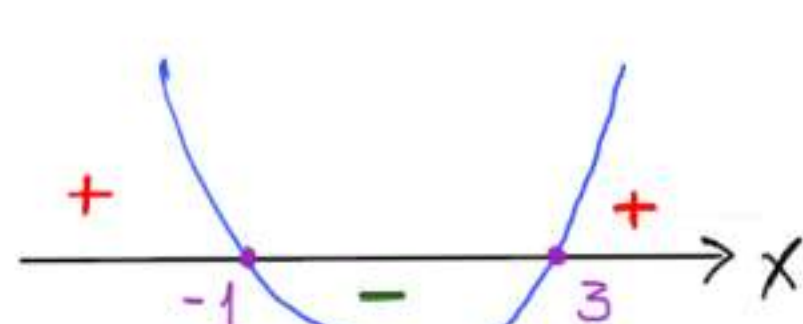
1. $y = x^2 - 2x - 3$

$a = 1 \Rightarrow a > 0$
 $b = -2$
 $c = -3$

$\Delta = \sqrt{(-2)^2 - 4 \cdot 1 \cdot (-3)}$
 $\Delta = \sqrt{4 + 12}$
 $\Delta = 4 \Rightarrow$ duas raízes reais e distintas

$\Delta = \sqrt{b^2 - 4 \cdot a \cdot c}$

De Bhaskara: $x' = \frac{2+4}{2} = 3$ $x'' = \frac{2-4}{2} = -1$



$f(x) = 0 \Rightarrow x = -1$ ou $x = 3$
 $f(x) > 0 \Rightarrow x < -1$ ou $x > 3$
 $f(x) < 0 \Rightarrow -1 < x < 3$

$y = 0 \Rightarrow$ se $x = -1$ ou $x = 3$
 $y > 0 \Rightarrow$ se $x < -1$ ou $x > 3$
 $y < 0 \Rightarrow$ se $-1 < x < 3$

2. $y = 4x^2 - 10x + 4$

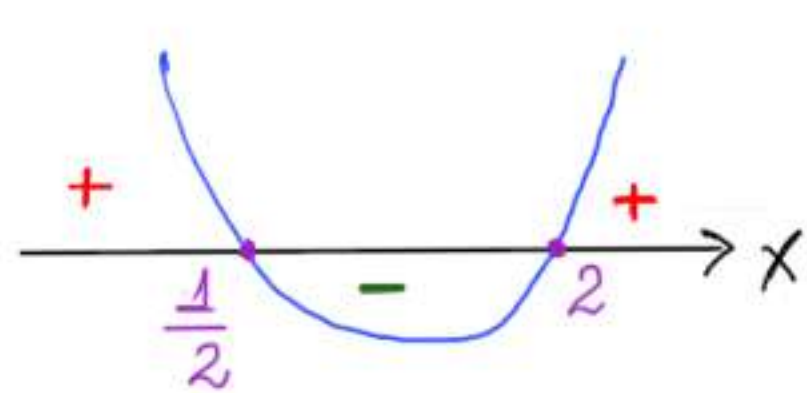
Fórmula:

$a = 4 \Rightarrow a > 0$
 $b = -10$
 $c = 4$

$\Delta = \sqrt{(-10)^2 - 4 \cdot 4 \cdot 4}$
 $\Delta = \sqrt{100 - 64}$
 $\Delta = 6 \Rightarrow$ duas raízes reais e distintas

$\Delta = \sqrt{b^2 - 4 \cdot a \cdot c}$

De Bhaskara: $x' = \frac{10-6}{8} = \frac{1}{2}$ $x'' = \frac{10+6}{8} = 2$



$f(x) = 0 \Rightarrow x = \frac{1}{2}$ ou $x = 2$
 $f(x) > 0 \Rightarrow x < \frac{1}{2}$ ou $x > 2$
 $f(x) < 0 \Rightarrow \frac{1}{2} < x < 2$

$y = 0 \Rightarrow$ se $x = 1/2$ ou $x = 2$
 $y > 0 \Rightarrow$ se $x < 1/2$ ou $x > 2$
 $y < 0 \Rightarrow$ se $1/2 < x < 2$

3. $y = -3x^2 + 6x - 3$

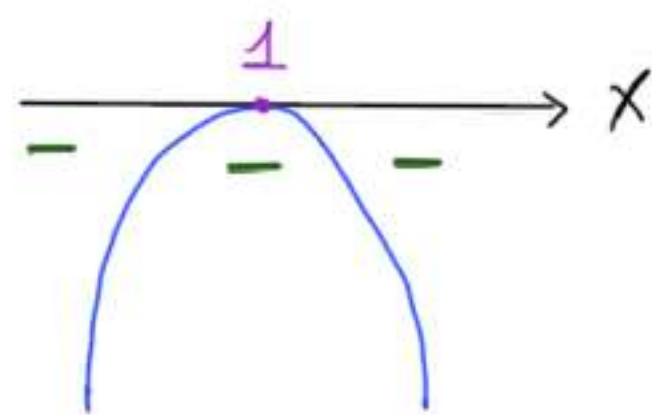
Fórmula:

$a = -3 \Rightarrow a < 0$
 $b = 6$
 $c = -3$

$\Delta = \sqrt{(6)^2 - 4 \cdot (-3) \cdot (-3)}$
 $\Delta = \sqrt{36 - 36}$
 $\Delta = 0 \Rightarrow$ duas raízes reais e iguais

$\Delta = \sqrt{b^2 - 4 \cdot a \cdot c}$

De Bhaskara: $x' = x'' = \frac{-6+0}{-6} = 1$



$f(x) = 0 \Rightarrow x = 1$
 $f(x) > 0 \Rightarrow \nexists x \in \mathbb{R}$
 $f(x) < 0 \Rightarrow x \neq 1$

$y = 0 \Rightarrow$ se $x = 1$
 $y < 0 \Rightarrow$ se $x \neq 1$

4. $y = x^2 - 3x + \frac{9}{4}$

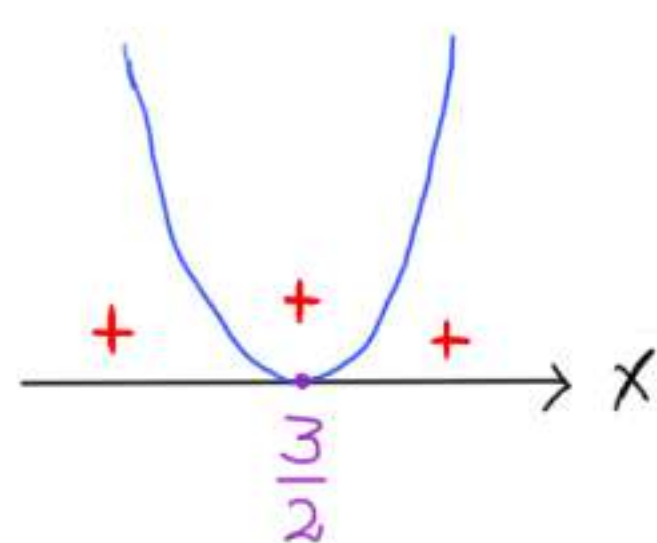
Fórmula:

$a = 1 \Rightarrow a > 0$
 $b = -3$
 $c = \frac{9}{4}$

$\Delta = \sqrt{(-3)^2 - 4 \cdot 1 \cdot (9/4)}$
 $\Delta = \sqrt{9 - 9}$
 $\Delta = 0 \Rightarrow$ duas raízes reais e iguais

$\Delta = \sqrt{b^2 - 4 \cdot a \cdot c}$

De Bhaskara: $x' = x'' = \frac{3+0}{2} = \frac{3}{2}$



$f(x) = 0 \Rightarrow x = \frac{3}{2}$
 $f(x) > 0 \Rightarrow x \neq \frac{3}{2}$
 $f(x) < 0 \Rightarrow \nexists x \in \mathbb{R}$

$y = 0 \Rightarrow$ se $x = 3/2$
 $y > 0 \Rightarrow$ se $x \neq 3/2$

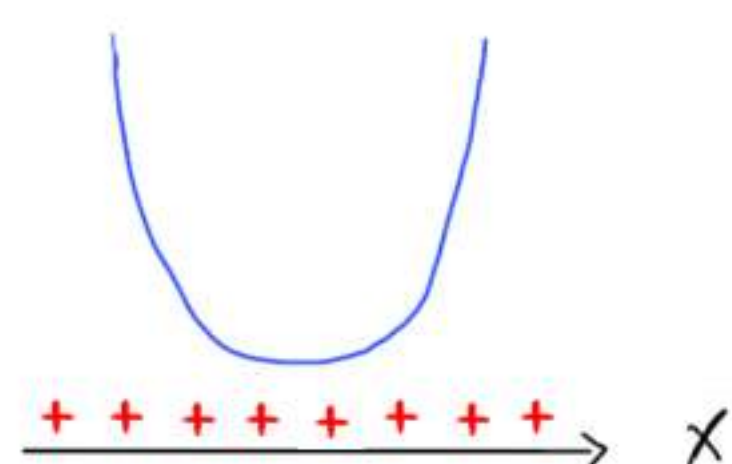
5. $y = 3x^2 - 4x + 2$

Fórmula:

$a = 3 \Rightarrow a > 0$
 $b = -4$
 $c = 2$

$\Delta = \sqrt{(-4)^2 - 4 \cdot 3 \cdot 2}$
 $\Delta = \sqrt{16 - 24}$
 $\Delta = \sqrt{-8} \Rightarrow$ não há raízes reais

$\Delta = \sqrt{b^2 - 4 \cdot a \cdot c}$



$f(x) > 0 \Rightarrow x \in \mathbb{R}$
 $f(x) < 0 \Rightarrow \nexists x \in \mathbb{R}$

$y > 0, \forall x \in \mathbb{R}$

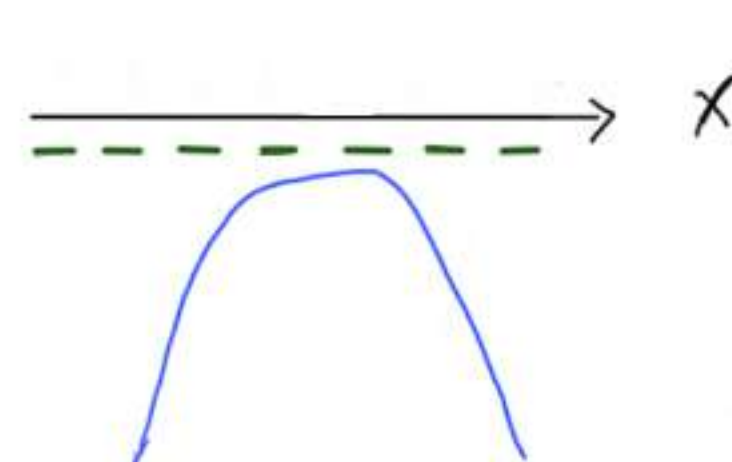
6. $y = -x^2 + x - 1$

Fórmula:

$a = -1 \Rightarrow a < 0$
 $b = 1$
 $c = -1$

$\Delta = \sqrt{(1)^2 - 4 \cdot (-1) \cdot (-1)}$
 $\Delta = \sqrt{1 - 4}$
 $\Delta = \sqrt{-3} \Rightarrow$ não há raízes reais

$\Delta = \sqrt{b^2 - 4 \cdot a \cdot c}$



$f(x) > 0 \Rightarrow \nexists x \in \mathbb{R}$
 $f(x) < 0 \Rightarrow x \in \mathbb{R}$

$y < 0, \forall x \in \mathbb{R}$