Sign Pattern Practice

Solutions

Generate a sign pattern and use it to sketch the graph on the given axes.

$$f(x) = x^3 - 7x^2 + 7x + 15$$

$$\begin{array}{r|cccc} -1 & 1 & -7 & 7 & 15 \\ & & -1 & 8 & -15 \\ \hline & 1 & -8 & 15 & 0 \end{array}$$

$(x+1)(x^2-8x+15)$

$(x+1)(x-3)(x-5)$

x-intercepts at

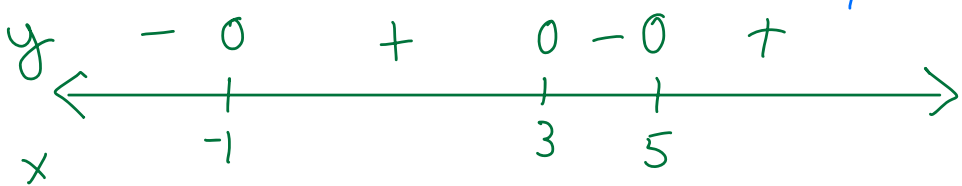
$(-1,0)$ $(3,0)$ and $(5,0)$

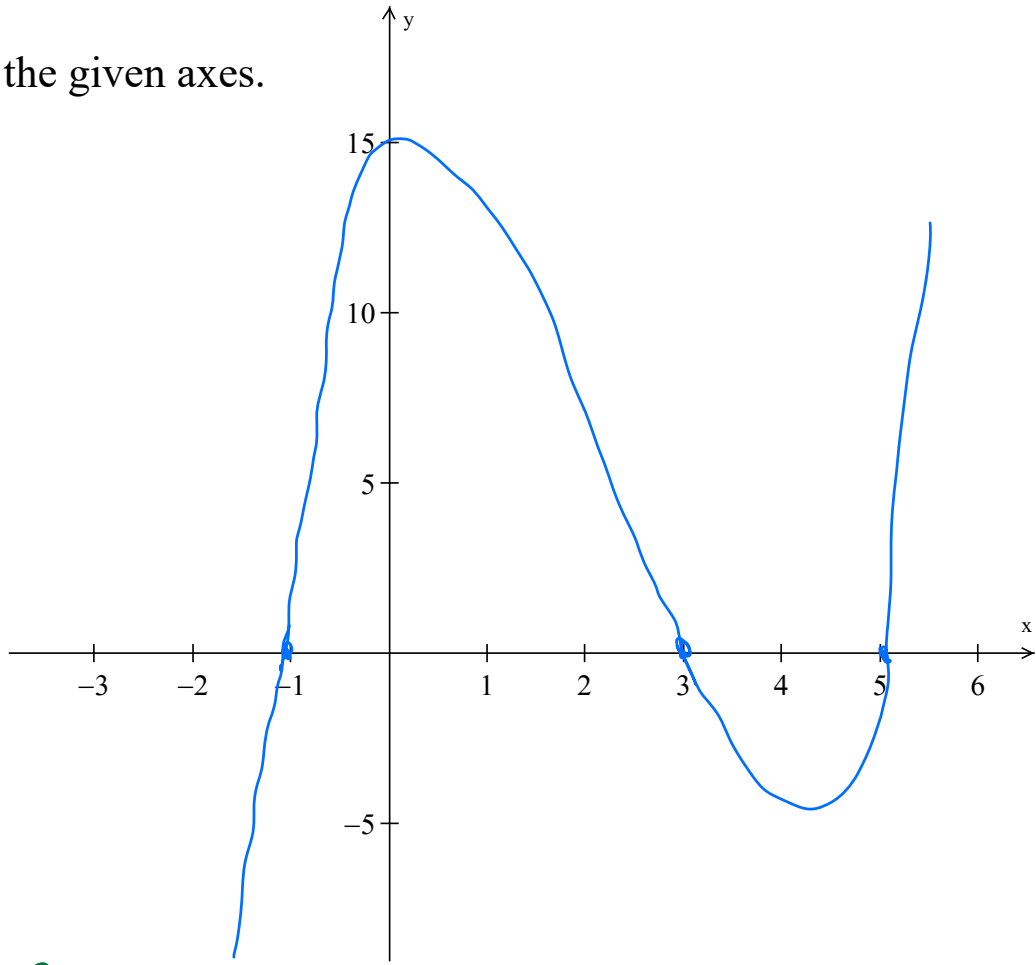
Remember:

Sign pattern for

x^3.... starts with

− and ends with +





Generate a sign pattern and use it to sketch the graph on the given axes.

$$f(x) = 2x^3 - 11x^2 + 2x + 15$$

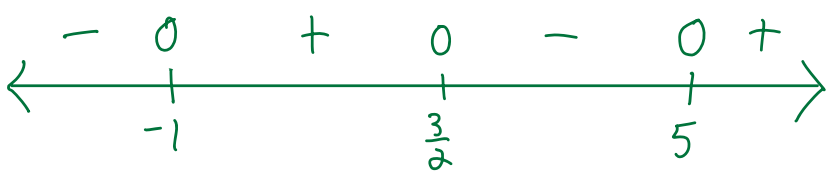
-1	2	-11	2	15
	-2	13	-15	
	2	-13	15	0

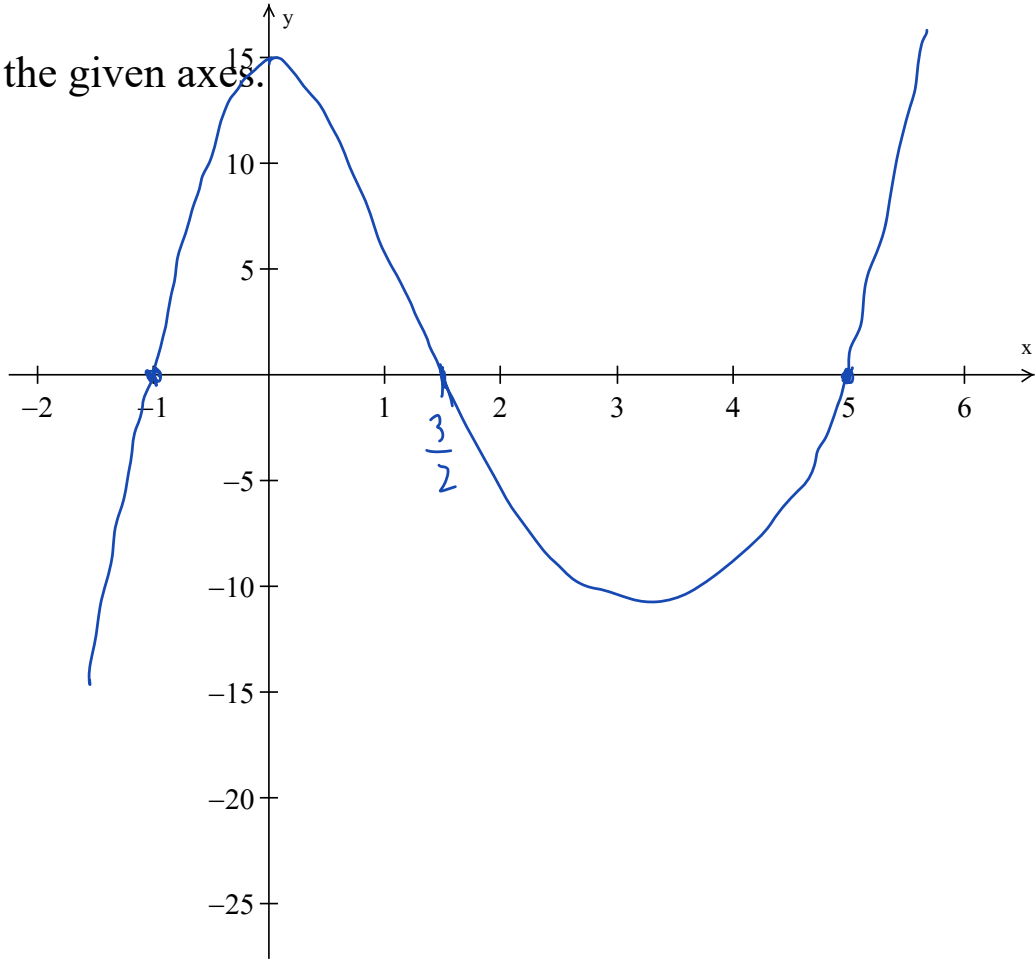
$(x+1)(2x^2 - 13x + 15)$

$(x+1)(2x-3)(x-5)$

x-intercepts at

$(-1, 0)\left(\frac{3}{2}, 0\right)(5, 0)$





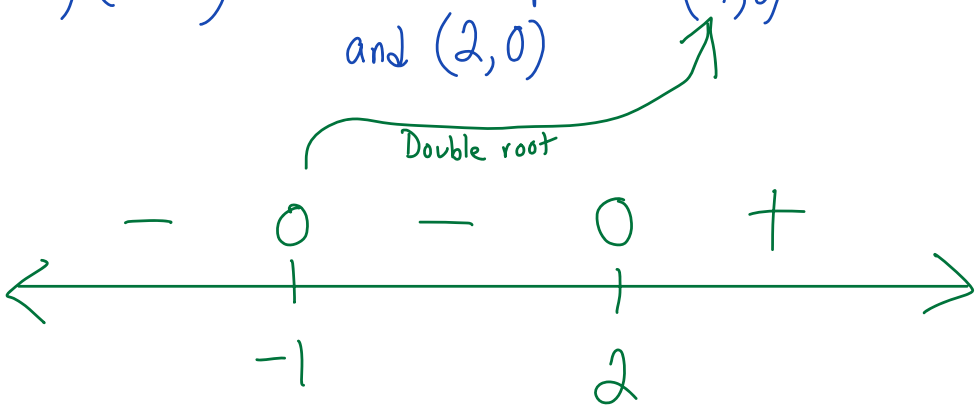
Generate a sign pattern and use it to sketch the graph on the given axes.

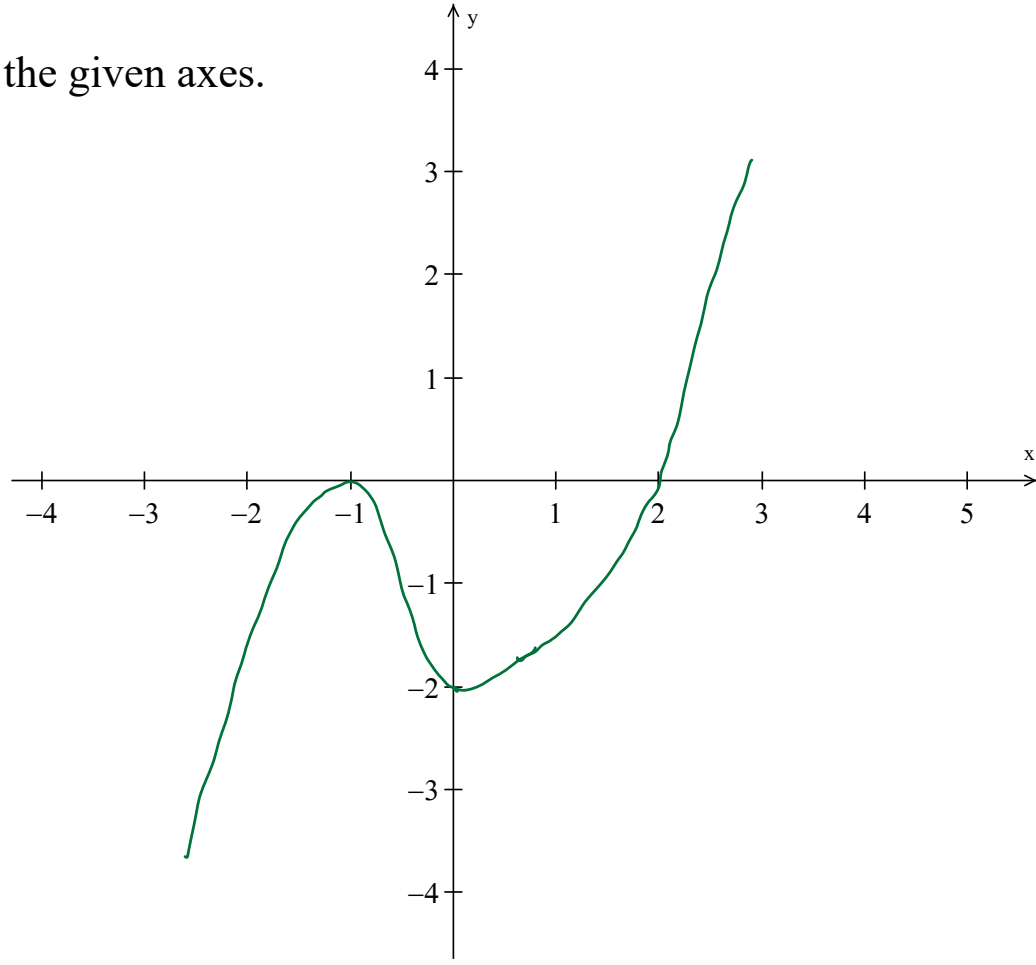
$$f(x) = x^3 - 3x - 2$$

2	1	0	−3	−2
	1	2	1	0

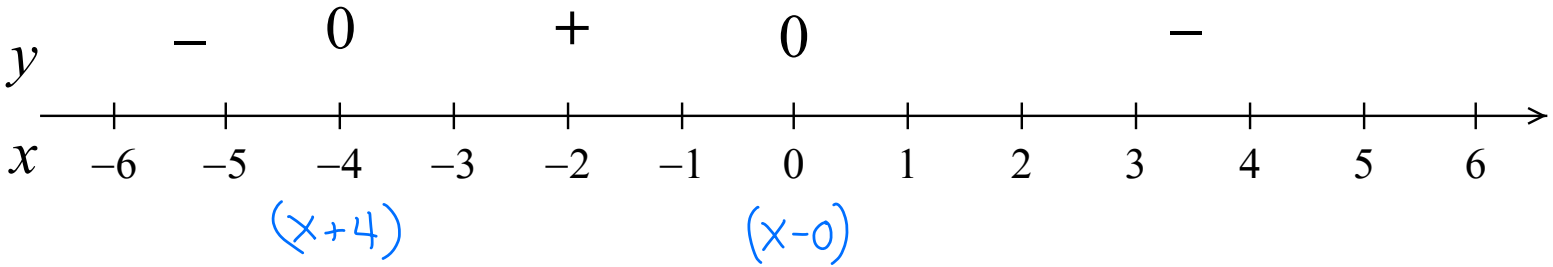
$(x-2)(x^2+2x+1)$

$(x-2)(x+1)^2 \Rightarrow$ x-intercepts at $(-1,0)$ and $(2,0)$

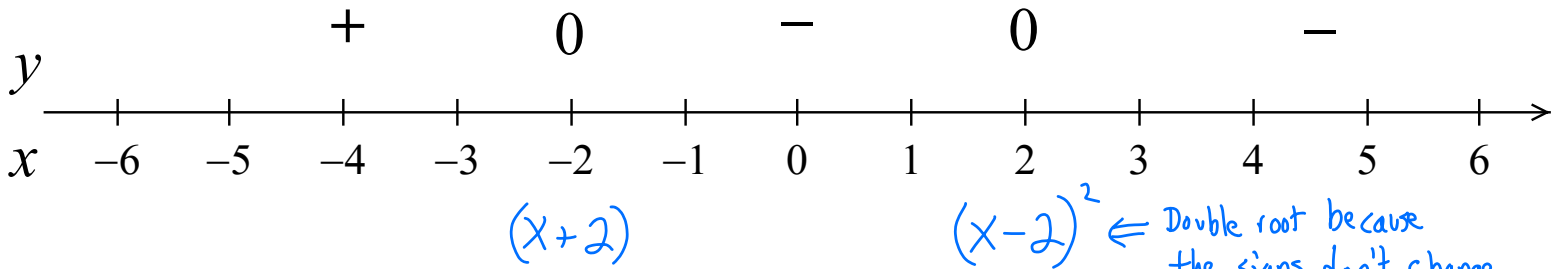




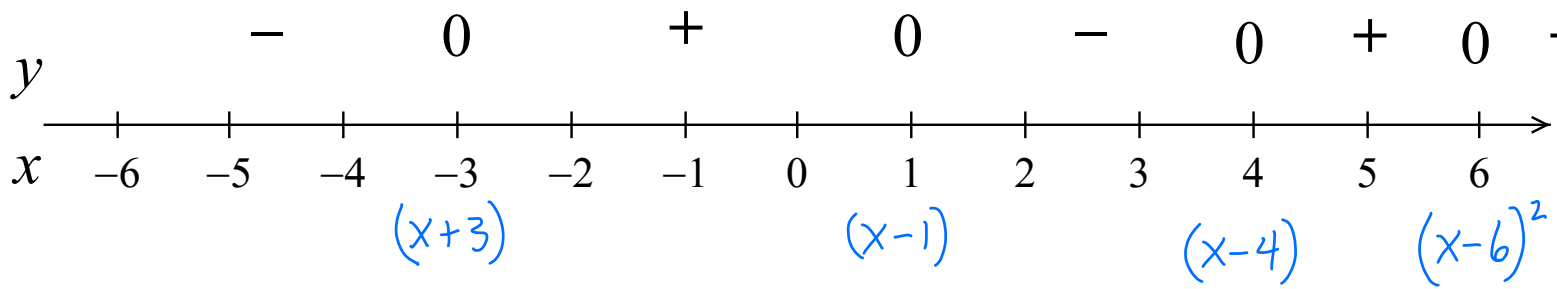
Write the function given the sign pattern



$y = -x(x+4)$

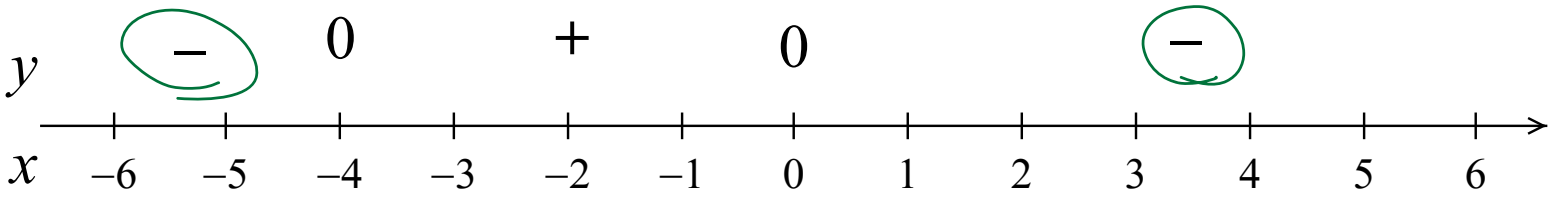


$y = -(x+2)(x-2)^2$



$y = (x+3)(x-1)(x-4)(x-6)^2$

Write the inequality over the given set of numbers and sign pattern

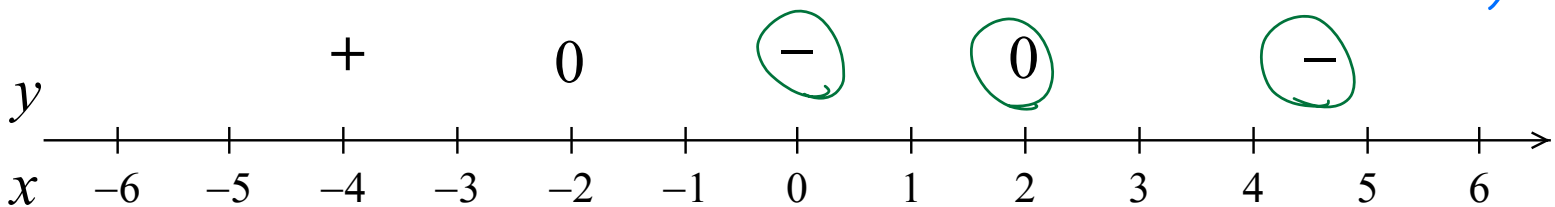


$x \in (-\infty, 4] \cup [0, \infty)$

which just means

$x < 4$ or $x > 0$

Answer : $-x(x+4) < 0$

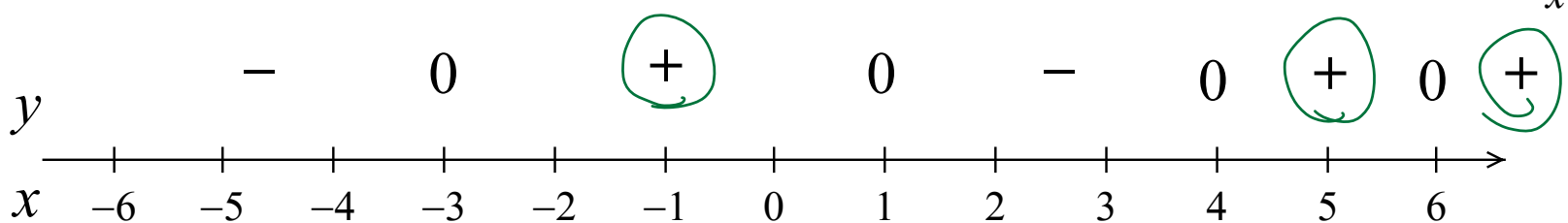


$x \in [-2, \infty)$

which just means

$x \geq -2$

Answer : $-(x+2)(x-2)^2 \leq 0$



$x \in (-3,1) \cup (4,6) \cup (6,\infty)$

which just means

$-3 < x < 1$
or
$4 < x < 6$
or
$x > 6$

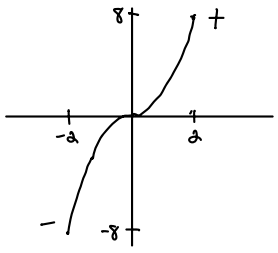
Answer : $(x+3)(x-1)(x-4)(x-6)^2 > 0$

A reminder of why even vs odd in sign patterns

$y = x^3$

$x = 2 \quad y = 8$

$x = -2 \quad y = -8$



$y = x^4$

$x = 2 \quad y = 16$

$x = -2 \quad y = 16$