2.7) Solving modulus problems

Worked example

$f(x) = 2|x + 1| - 3, x \in \mathbb{R}$

(a) Sketch the graph of $y = f(x)$

(b) State the range of f.

(c) Solve the equation $f(x) = \frac{1}{3}x + 2$

Your turn

$p(x) = 3|x - 1| - 2, x \in \mathbb{R}$

(a) Sketch the graph of $y = p(x)$

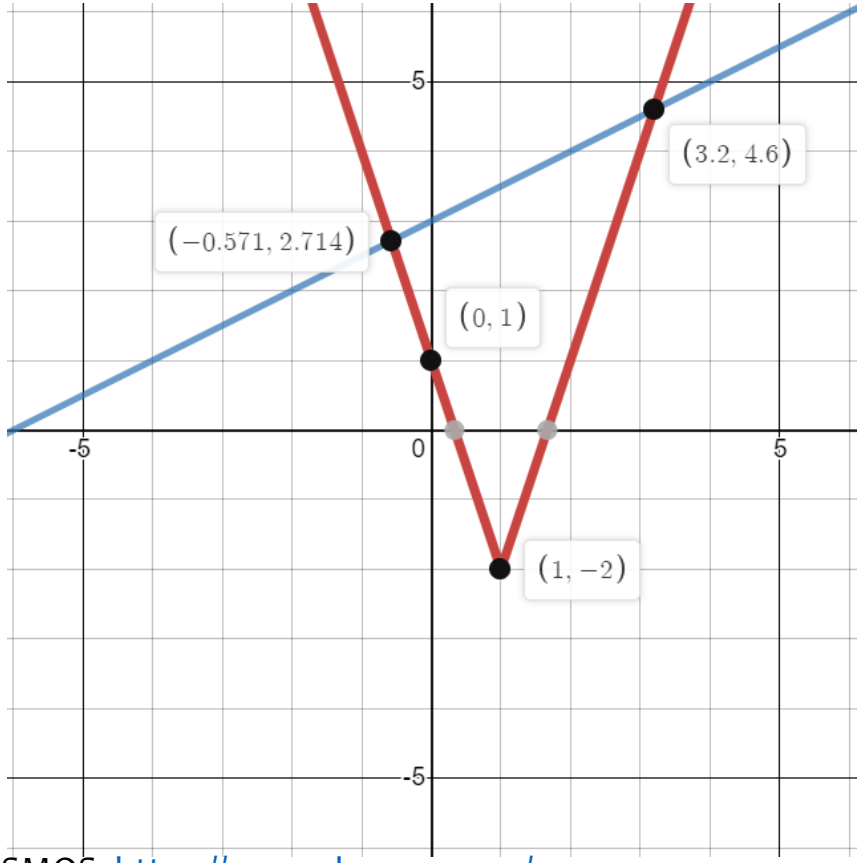
(b) State the range of p.

(c) Solve the equation $p(x) = \frac{1}{2}x + 3$

(a) Sketch

(b) $p(x) \geq -2$

(c) $x = -\frac{4}{7}, x = \frac{16}{5}$



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Worked example

$f(x) = 6 - 2|x + 3|, x \in \mathbb{R}$

(a) Sketch the graph of $y = f(x)$

(b) State the range of f.

(c) Solve the inequality $f(x) > 5$

Your turn

$p(x) = 6 - 2|x + 3|, x \in \mathbb{R}$

(a) Sketch the graph of $y = p(x)$

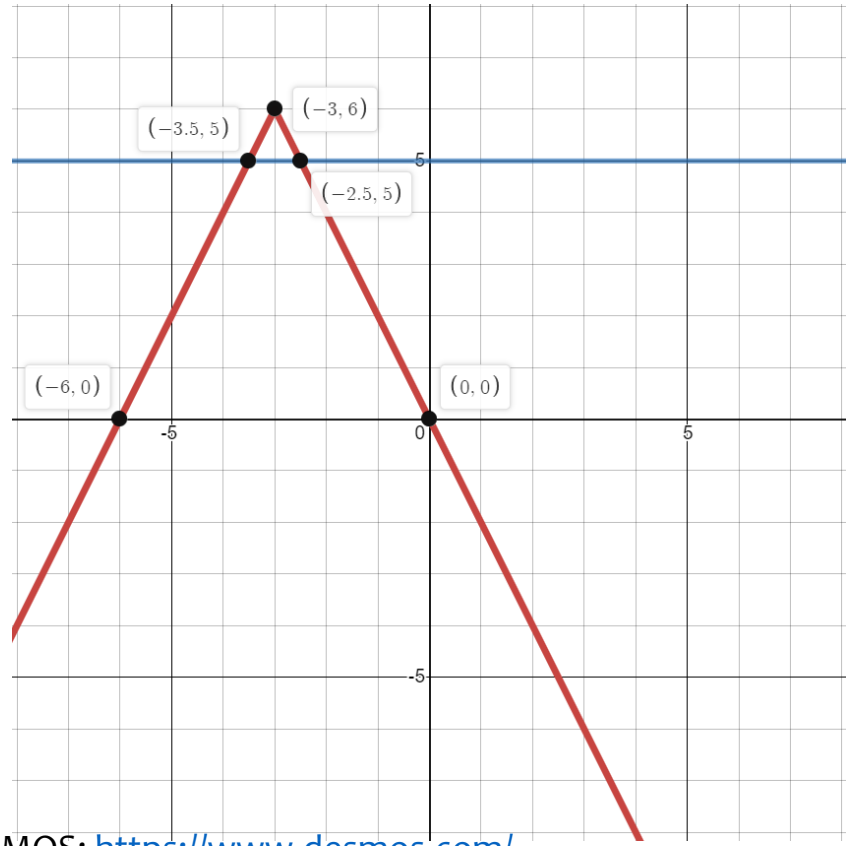
(b) State the range of p.

(c) Solve the inequality $p(x) > 5$

(a) Sketch

(b) $p(x) \leq 6$

(c) $-\frac{7}{2} < x < -\frac{5}{2}$



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Worked example

$f(x) = 6 + 3|x - 2|, x \in \mathbb{R}$

State the range of values of k for which $f(x) = k$ has:

a) no solutions

b) exactly one solution

c) two distinct solutions

Your turn

$h(x) = 6 - 2|x + 3|, x \in \mathbb{R}$

State the range of values of k for which $f(x) = k$ has:

a) no solutions

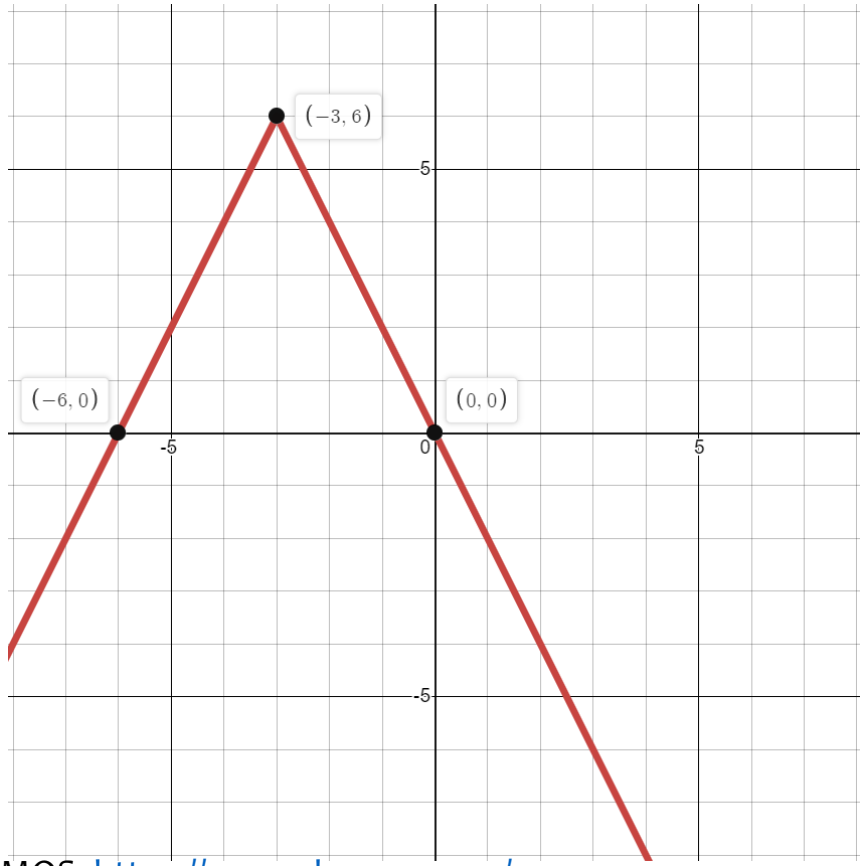
b) exactly one solution

c) two distinct solutions

a) $k > 6$

b) $k = 6$

c) $k < 6$



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