10/09

Monday, October 9, 2017 11:03 AM

HW 3.5A,B will be extended to tonight.

Exam 2 • review at MMC 10AM–12PM on Saturday

• online review on Sunday 8–9PM

Section 3.6

Solving $x^2-3x+2 \geq 0$

graph $f(x) = x^2-3x+2=0$

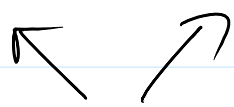
find zeros: $x^2-3x+2=0$

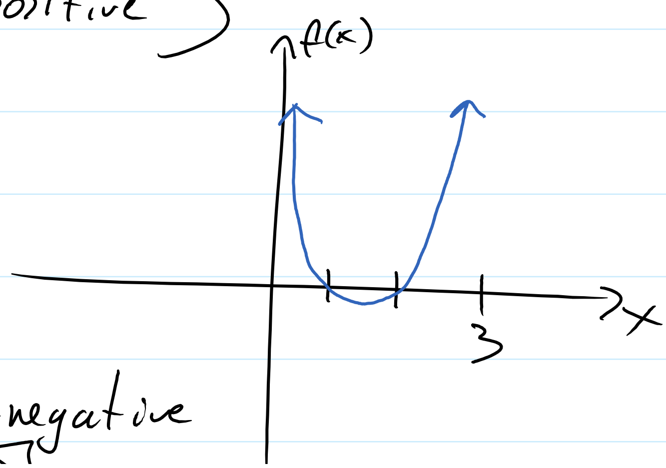
$(x-2)(x-1)=0$

$x=2, \quad x=1$

graph: degree: 2

lead. coeff: positive





The function is non-negative

The function is non-negative on $\boxed{(-\infty, 1] \cup [2, \infty)}$

To solve a polynomial inequality:

1. Solve $f(x) = 0$ to get the boundary pts.
2. Write the boundary pts on a number line
3. Choose a test value from each interval and evaluate f at that number
4. Write the solution set, selecting the intervals that satisfy the inequality.

Ex: Solve: $2x^2 + x > 15$

$$2x^2 + x - 15 > 0$$

$$\underbrace{2x^2 + 6x} \underbrace{- 5x - 15} > 0 \qquad A \cdot C = 2 \cdot (-15) = -30$$

$$A + C = 1$$

$$2x(x+3) - 5(x+3) > 0 \qquad A = +6,\ C = -5$$

$$(x+3)(2x-5) > 0$$

$$x + 3 = 0 \qquad 2x - 5 = 0$$

$$x = -3 \qquad x = 5/2$$

$5/2 = 2.5$

-3

$\frac{5}{2} = 2.5$

-3

$+ + + + + + + + \,|\, - - - - - - - - \,|\, + + + +$

$(-\infty, -3) \qquad (-3, \tfrac{5}{2}) \qquad (\tfrac{5}{2}, \infty)$

	interval	$(-\infty,-3)$	$(-3,\frac{5}{2})$	$(\frac{5}{2},\infty)$
	test value	-4	0	3
sign	$x+3$	$-$	$+$	$+$
sign	$2x-5$	$-$	$-$	$+$
	sign of $f(x)$	$+$	$-$	$+$

To solve $\quad f(x) > 0$

$$\boxed{(-\infty,-3) \cup (\tfrac{5}{2},\infty)}$$

<u>Ex:</u> Solve: $\quad 4x^2 \le 1 - 2x$

$\qquad\qquad -1+2x \quad -1+2x$

$$\boxed{4x^2 - 1 + 2x \le 0}$$

$f(x) = 4x^2 + 2x - 1$

$f(x) = 0$

$4x^2 + 2x - 1 = 0$

$-2 \pm \sqrt{2^2 - 4\cdot 4\cdot(-1)}$

$A \cdot C = 4\cdot(-1) = -4$

$A + C = 2$

$$x = \frac{\qquad\qquad}{2 \cdot 4}$$

none

$$= \frac{-2 \pm \sqrt{4+16}}{8} = \frac{-2 \pm \sqrt{20}}{8} = \frac{-2 \pm \sqrt{4}\cdot\sqrt{5}}{8}$$

$$= \frac{-2 \pm 2\sqrt{5}}{8} = \frac{\cancel{2}(-1 \pm \sqrt{5})}{\cancel{8}\,4} = \frac{-1+\sqrt{5}}{4}, \quad \frac{-1-\sqrt{5}}{4}$$

$\frac{-1-\sqrt{5}}{4}$ $\qquad$ $\frac{-1+\sqrt{5}}{4}$

b/c $f(x) \leq 0$

int	$\left(-\infty, \frac{-1-\sqrt{5}}{4}\right]$	$\left[\frac{-1-\sqrt{5}}{4}, \frac{-1+\sqrt{5}}{4}\right]$	$\left[\frac{-1+\sqrt{5}}{4}, \infty\right)$
test pt	-10	0	10
$4x^2+2x-1$	$4\cdot(-10)^2-20-1$ $400-21$ $+$	$0+0-1$ $-$	$4\cdot 10^2+20-1$ $+$

solution: $\boxed{\left[\frac{-1-\sqrt{5}}{4}, \frac{-1+\sqrt{5}}{4}\right]}$