

Math 112

Exam 1

Self graded

1 pt 1a)

3 pt 2b)
pts

$$g = 3x + 1$$

x	g

no points



Key

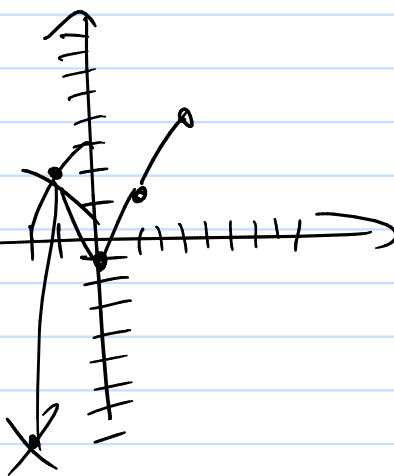
50% (missed)

Your work

Why?

1b) $g = 3x - 1$

x	g
-2	$-8 \neq 3(-2) - 1 = -7$
-1	<u>2</u> $\neq 3(-1) - 1 = -4$
0	-1
1	$2 = 3(1) - 1 = 2$
2	4



what did I do wrong? (explain)

missed points

4 pts 4a)

$$f(x) = \frac{1}{x^2} + 2$$

ans. symmetric about origin

guessed, I thought

maybe the problem had each possible answer once, so I guessed b/c the other two I had sym. about y-axis and neither.

Should have said $f(-x)$

Key

$$f(x) = \frac{1}{x^2} + 2$$

$$\rightarrow f(-x) = \frac{1}{(-x)^2} + 2 = \frac{1}{x^2} + 2 = f(x)$$

sym. about y-axis

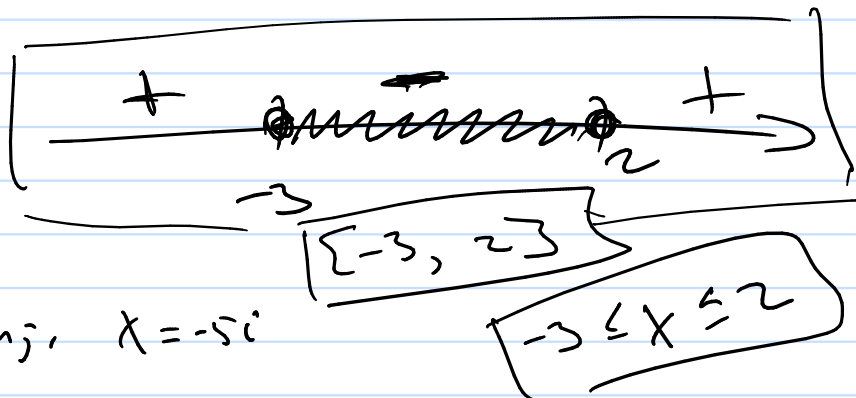
Key obs
Correct

$$x^2 + 2x \leq x + 6$$

$$x^2 + x - 6 \leq 0$$

$$(x+3)(x-2) \leq 0$$

$(x^2 + x - 6 \leq 0)$



(12) $x = 5i$ complex conj, $x = -5i$
 $(x - 5i)(x + 5i) = x^2 + 25$

Ch 4

Rationals:

Solving Rational Equations

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

$$\frac{2x}{(x+1)} - \frac{1}{(x+1)(x-1)} = \frac{3}{1}$$

$$(x+1)(x-1) \left[\frac{2x}{(x+1)} - \frac{1}{(x+1)(x-1)} \right] = \left[\frac{3}{1} \right] (x+1)(x-1)$$

$$\cancel{(x+1)}(x-1) \frac{2x}{\cancel{(x+1)}} - \frac{1}{\cancel{(x+1)}(x-1)} = 3(x+1)(x-1)$$

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

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

$$\frac{a}{b} = \frac{c}{d}$$

$$a \cdot d = b \cdot c$$

$$\frac{a}{b} = \frac{c}{d}$$

common denominator bd

$$bd \left(\frac{a}{b} \right) = bd \left(\frac{c}{d} \right)$$

$$ad = bc$$

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

$$\frac{2x}{(x+1)} - \frac{1}{(x+1)(x-1)} = \frac{3}{1} \quad \text{Factored}$$

$$(x+1)(x-1) \left[\frac{2x}{(x+1)} - \frac{1}{(x+1)(x-1)} \right] = \left[\frac{3}{1} \right] (x+1)(x-1) \quad \text{Mult. by common den}$$

$$\cancel{(x+1)}(x-1) \frac{2x}{\cancel{(x+1)}} - \frac{1}{\cancel{(x+1)}(x-1)} = 3(x+1)(x-1)$$

$x \neq 1$
 $x \neq -1$

$$2x(x-1) - 1 = 3(x+1)(x-1) \quad \text{Denom. are all gone!}$$

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

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

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

$$a=1, b=2, c=-2$$

Quad. formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-2 \pm \sqrt{4 - 4(1)(-2)}}{2(1)}$$

$$x = -1 \pm \frac{\sqrt{12}}{2} = -1 \pm \frac{2\sqrt{3}}{2}$$

$$x = -1 + \sqrt{3}$$

$$x = -1 - \sqrt{3}$$

Note: an extraneous solution

$$x - 1 = 0$$

Compare

$$\text{Sol. } x = 1$$

$$x - 1 = 0$$

$$x = 1$$

$$x^2 = 1^2$$

$$x^2 = 1 \rightarrow x^2 - 1 = 0$$

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

$$\cancel{x = -1} \quad x = 1 \quad \checkmark$$

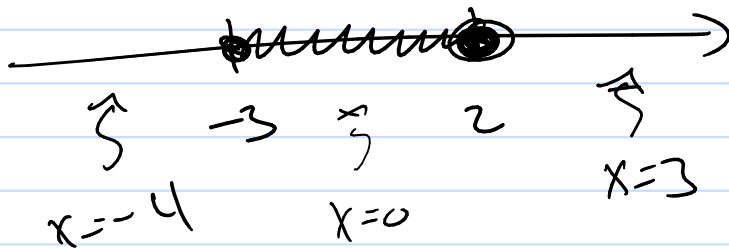
Rational Inequalities:

Note: Polynomial Inequalities

$$x^2 + x \leq 6$$

$$x^2 + x - 6 \leq 0$$

$$(x+3)(x-2) \leq 0$$



Rational? $r(x) \begin{matrix} < \\ > \\ \leq \\ \geq \\ \uparrow \end{matrix} 0$

$\frac{p(x)}{d(x)} \begin{matrix} < \\ \leq \\ > \\ \geq \\ \uparrow \end{matrix} 0$

plot zeros of
 $p(x), d(x)$

(ex) $\frac{1}{x+1} + 2 \leq 3x \rightarrow \frac{1}{x+1} + \frac{2}{1} - \frac{3x}{1} \leq 0$

$\rightarrow \frac{1 + 2(x+1) - 3x(x+1)}{x+1} \leq 0 \rightarrow \frac{-3x^2 - x + 3}{x+1} \leq 0$

