Warm up

Evaluate

1. $f(x) = -3x^2 + x - 2$ for

$f(-2) = -3(-2)^2 + (-2) - 2 = -16$

$f(x+1) = -3(x+1)^2 + (x+1) - 2 = -3x^2 - 5x - 4$

2. $f(x) = \begin{cases} 2x^2 - 1 & x > 1 \\ 4x + 6 & x \le 1 \end{cases}$ for $f(3)$ $f(1) = 10$ $f(0) = 6$

$2(3)^2 - 1$

17

3. State the domain and range. Is it a function?

$\{(6,2)(8,3)(9,-1)(3,2)\}$

GO COUGARS!

Homework Questions

$$f(x) = \begin{cases} x+2 & x<0 \\ 4 & 0 \le x < 2 \\ x^2+1 & x \ge 2 \end{cases}$$

$f(-2) = 0$

$f(1) = 4$

1.2 Domains

graphically

algebraically

1.3 Graphs of Functions
intervals of increase and decrease
maximums and minumums

Interval notation review

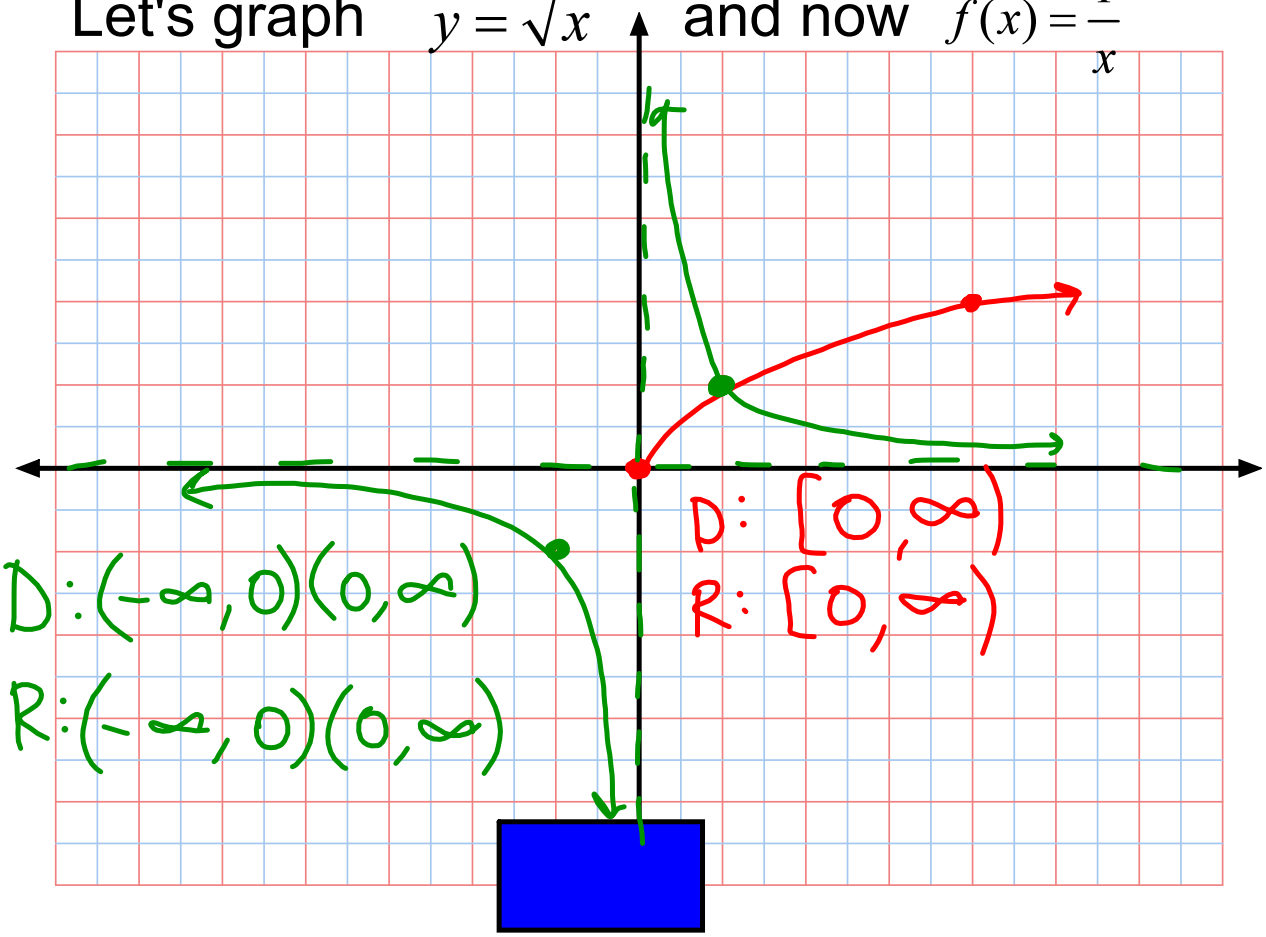
round brackets mean $(4, \infty)$

square brackets mean

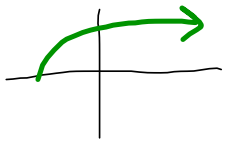
inclusive

$[4, \infty)$

Let's graph $y = \sqrt{x}$ and now $f(x) = \frac{1}{x}$



1 On you calculator graph $y=\sqrt{x+3}$

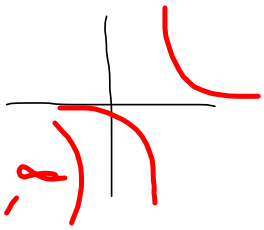


What are the domain and range?

D: $[-3,\infty)$ R: $[0,\infty)$

Now graph $f(x)=\dfrac{1}{x-2}$ Right 2

What are the domain and range?



D: $(-\infty,2)(2,\infty)$ R: $(-\infty,0)(0,\infty)$

How about $y=3x^3+5x^2+x+1$

What are the domain and range?

D: $(-\infty,\infty)$

R: $(-\infty,\infty)$

Finding Domains Algebraically

Exception #1: Square Root

set inside ≥ 0

$f(x)=\sqrt{x}$

$x \geq 0$

$[0,\infty)$

$f(x)=\sqrt{5x+1}$

$5x+1 \geq 0$

$x \geq -\frac{1}{5}$

$[-\frac{1}{5},\infty)$

Exception #2: Rational Equation (x in denominator)

set denominator $\neq 0$

$f(x)=\frac{1}{x+4}$

$x+4 \neq 0$

$x \neq -4$ $(-\infty,-4)(-4,\infty)$

$f(x)=\frac{1}{x^2-7x+12}$ $\neq 0$

$(x-4)(x-3) \neq 0$

$x \neq 4, 3$

$(-\infty,3)(3,4)(4,\infty)$

Exception #3: combo (square root in denominator)

$y=\frac{1}{\sqrt{x}}$

$x \neq 0$

$x \geq 0$

$x > 0$

$(0,\infty)$

$y=\frac{x+3}{x\sqrt{x+3}}$

$x \neq 0$ $x+3>0$

$x>-3$

$(-3,0)(0,\infty)$

**Increasing and Decreasing Intervals

**Maximums and Minimums

Increasing Portion of a Function:
When traveling from left to right, what values of x cause the values of y to increase?

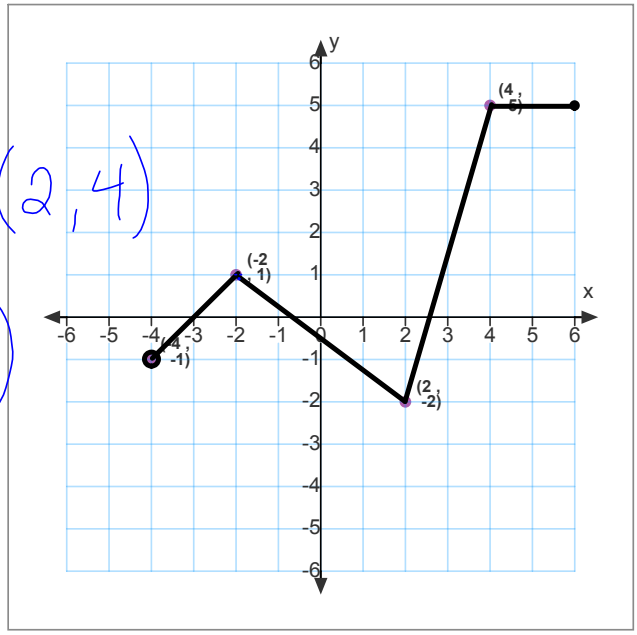
(-4,-2), (2,4)

Decreasing Portion of a Function:
When traveling from left to right, what values of x cause the values of y to decrease?

(-2,2)

Constant Portion of a Function:
When traveling from left to right what values of x cause the values of y to be constant (unchanging)?

(4,6)



Relative maximum - the highest point on the graph of a polynomial.

Relative minimum - the lowest point on the graph of a polynomial.

Graph $y = x^3 - 6x^2 + 15$ on your calculator.

Find the maximum (if any) and the minumum (if any)

max @ x=0 max value: 15

Find the interval(s) over which the function increases, decreases and/or is constant

min @ x=4

min value: -17

HOMEWORK

P 24 53-65 odd, 62
P 38 2-5 all (domain only), 7(domain only),
11-27 odd, 31-35 odd