

HW Quiz
Section 4.1

35, 53

Solutions

(35) $g(y) = \frac{y-1}{y^2-y+1}$ Find critical numbers.

$$f = y-1 \quad g = y^2 - y + 1$$

$$f' = 1 \quad g' = 2y - 1$$

$$g'(y) = \frac{1(y^2 - y + 1) - (2y - 1)(y - 1)}{(y^2 - y + 1)^2}$$

$$g'(y) = \frac{y^2 - y + 1 - (2y^2 - 2y - y + 1)}{(y^2 - y + 1)^2}$$

$$g'(y) = \frac{y^2 - y + 1 - 2y^2 + 3y - 1}{(y^2 - y + 1)^2}$$

$$g'(y) = \frac{-y^2 + 2y}{(y^2 - y + 1)^2}$$

$$g'(y) = 0$$

 $g'(y)$ undefined

$$-y^2 + 2y = 0$$

$$-y(y - 2) = 0$$

$$\underbrace{y^2 - y + 1 = 0}_{\text{not real}}$$

$$y = 0$$

$$y = 2$$

so
$$\begin{array}{l} y = 0 \\ y = 2 \end{array}$$

53 $f(x) = x + \frac{1}{x}$ $[0.2, 4]$

find absolute min and max

$$f(x) = x + x^{-1}$$

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

$$f'(x) = 0$$

$$x^2 - 1 = 0$$

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

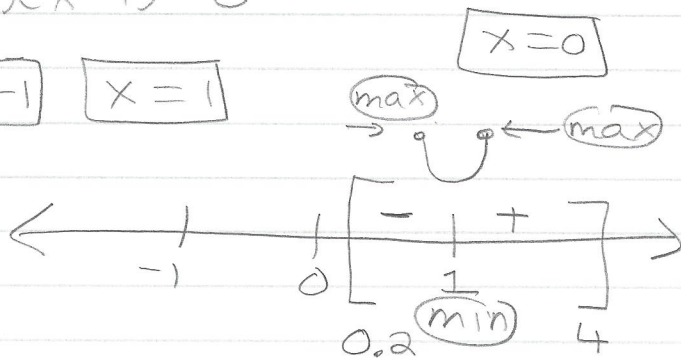
$$x = -1$$

$$x = 1$$

$$f'(x) \text{ undefined}$$

$$x^2 = 0$$

$$x = 0$$



test

$$f'(0.5) = -$$

$$f'(1.5) = +$$

$$f(0.2) = 0.2 + \frac{1}{0.2} = 5.2$$

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

$$f(4) = 4 + \frac{1}{4} = 4.25$$

absolute max is 5.2 occurs at $x = 0.2$

absolute min is 2 occurs at $x = 1$