

30. see graph p292

$$f(x) = g'(x)$$

b/c when $f'(x) = 0, g(x) = 0$
when $f'(x) < 0, g(x) < 0$

41. sketch the graph:

$$f(x) = -2x^3 + 3x^2 + 12x + 2$$

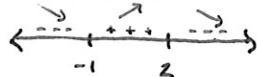
Domain: $(-\infty, \infty)$

y-int: $y = 2$

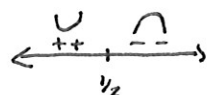
$$f'(x) = -6x^2 + 6x + 12 = 0$$

$$-6(x^2 - x - 2) = 0$$

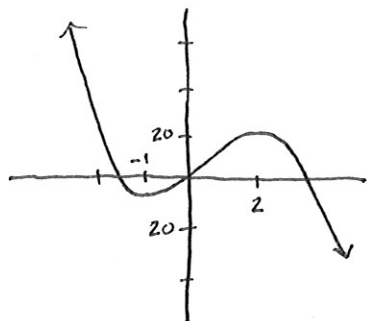
$$-6(x-2)(x+1) = 0; x = 2, -1$$



$$f''(x) = -12x + 6 = 0, x = 1/2$$



$$f(-1) = -5, f(2) = 22, f(1/2) = 8.5$$



62. Avg Cost: $\bar{C}(x) = 2.2 + \frac{2500}{x}$

(a) HA of $\bar{C}(x)$:

$$\lim_{x \rightarrow \infty} \left(2.2 + \frac{2500}{x} \right) = 2.2$$

$$\lim_{x \rightarrow -\infty} \left(2.2 + \frac{2500}{x} \right) = 2.2$$

HA: $y = 2.2$

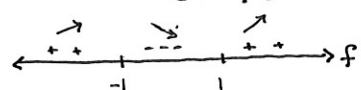
(b) Limiting value?

\$2.20

36. sketch the graph: $f(x) = x - 3x^{1/3}$

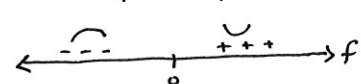
Domain: $(-\infty, \infty)$

x-int: $\pm 3\sqrt{3}, 0$

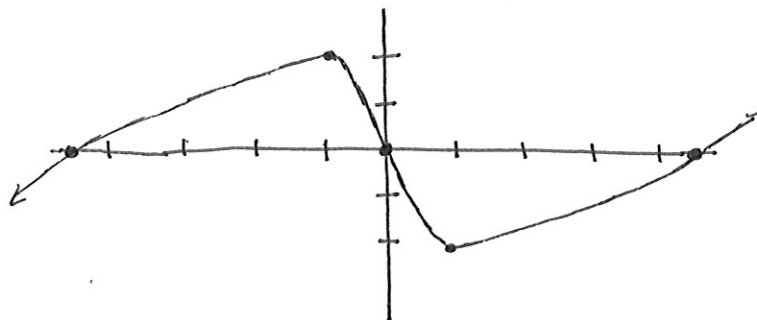


max: $(-1, 2)$

min: $(1, -2)$



inflection pt: $(0, 0)$



52. sketch the graph: $f(x) = \frac{x}{x-1}$

Domain: $(-\infty, 1) \cup (1, \infty)$

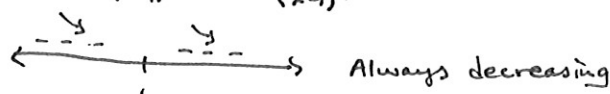
y/x-int: 0

HA: $y = 1$ b/c $\lim_{x \rightarrow \pm\infty} \frac{x}{x-1} = 1$

VA: $x = 1$

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

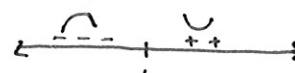
crit #: $x = 1$



Always decreasing

$$f''(x) = \frac{2}{(x-1)^3}$$

crit #: $x = 1$



$$f(2) = 2$$

$$f(-1) = -1/2 = -1/2$$

