(1) $f(x) = \dfrac{4x}{x-6}$ $\qquad$ $\dfrac{4x}{x-6} = \dfrac{0}{1}$ $\quad$ $x = 0$ $\quad$ Root

Vertical Asymptote $\quad x = 6$ $\qquad$ Horizontal Asymptote $\quad \displaystyle\lim_{x \to \infty} \dfrac{4x}{x-6} = \dfrac{4x}{x} =$

$f'(x) = \dfrac{b a' - a b'}{b^2}$

$= \dfrac{(x-6)(4) - (4x)(1)}{(x-6)^2}$

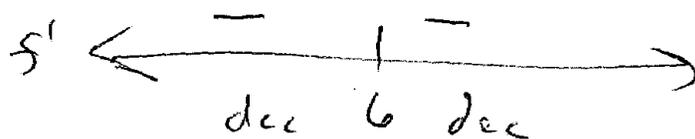$\dfrac{-24}{(x-6)^2} = \dfrac{0}{1}$ $\qquad$ POND @ $x = 6$

$-24 = 0$

No Critical Value

$= \dfrac{4x - 24 - 4x}{(x-6)^2}$

$f'(x) = \dfrac{-24}{(x-6)^2}$

$f' \quad \xleftarrow{\quad -\quad\; \mid \quad -\quad} $
$\qquad\qquad$ dec $\quad$ 6 $\quad$ dec

$f''(x) = \dfrac{b a' - a b'}{b^2}$

$\dfrac{(x-6)^2(0) - (-24)(2(x-6)^1 \;\;\overset{B}{\times}\;\; \overset{A}{(1)})}{((x-6)^2)^2}$

$f' \quad \xleftarrow{\;-\;\mid\;+\;} $
$\qquad\qquad\quad 6$

$= \dfrac{48(x-6)}{(x-6)^4}$

$f''(x) = \dfrac{48}{(x-6)^3}$

BIC $\quad \xleftarrow{\qquad\;\mid\;\qquad}$
$\quad f' \qquad$ dec $\quad$ 6 $\quad$ dec
$\quad f'' \qquad\;\; \downarrow \qquad\qquad \uparrow$
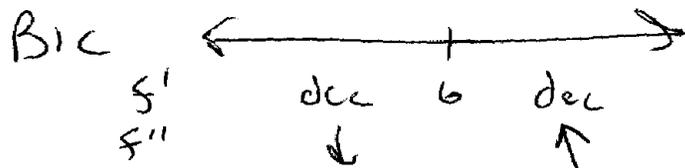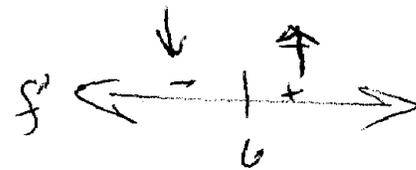
$\dfrac{48}{(x-6)^3} = \dfrac{0}{1}$ POND @ $x = 6$

$48 \ne 0$

No Critical Value
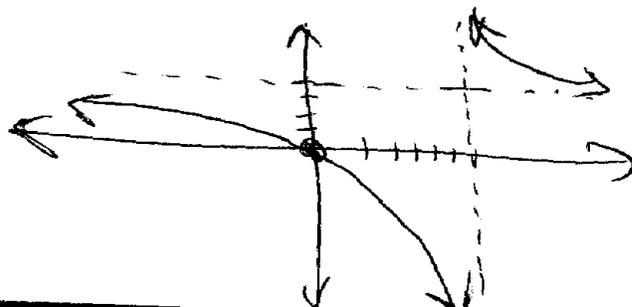
② $f(x) = 2x^{1/5} - 3x$

No Asymptotes

$f'(x) = \frac{2}{5}x^{-4/5} - 3$

$f''(x) = \frac{-8}{25}x^{-9/5}$

$f'(x) = \frac{2}{5x^{4/5}} - 3$

$f''(x) = \frac{-8}{25x^{9/5}}$

$-8 \neq 0$ No critical value

Common denom

POND @ $x = 0$

$\frac{2}{5x^{4/5}} - \frac{15x^{4/5}}{5x^{4/5}}$

$f'(x) = \frac{2 - 15x^{4/5}}{5x^{4/5}} = \frac{0}{1}$

POND $(0,0)$

$2 - 15x^{4/5} = 0$

$-15x = -2$

$x = 2/15$

$x = (2/15)^{5/4}$

$x = .08$

$x = 0$

0 inc $.08$ dec

$(0,0)$

$(.08, .9c)$

$\boxed{B R}$

	dec	inc $.08$	dec
f'		0	
f''	↑	↓	↓

TP $(.08, .9c)$
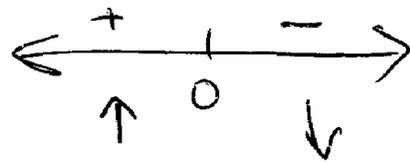
POND $(0,0)$
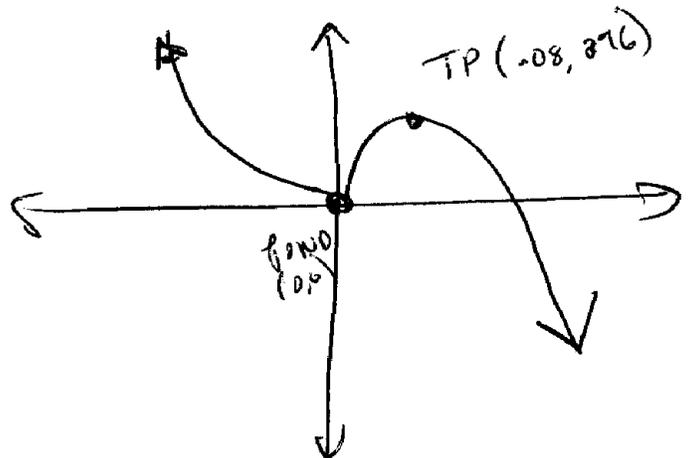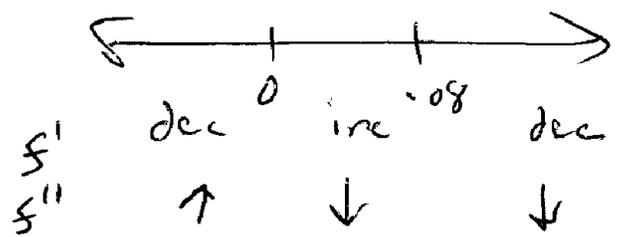
③ $y = (x-2)^{1/3}$

Roots: $\left((x-2)^{1/3}\right)^{3/1} = (0)^{3/1}$

$x - 2 = 0$ $\boxed{x = 2 \quad \text{Root}}$

$y' = \frac{1}{3}(x-2)^{-2/3}$ ✗   A (1)

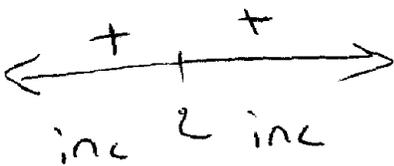$\boxed{y' = \frac{1}{3}(x-2)^{-2/3}}$ ⟶ $y'' = -\frac{2}{9}(x-2)^{-5/3}$
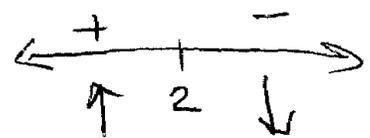
$y' = \dfrac{1}{3(x-2)^{2/3}}$

$y'' = \dfrac{-2}{9(x-2)^{5/3}}$

$\dfrac{1}{3(x-2)^{2/3}} = \dfrac{0}{1}$

$1 \neq 0$ No critical value

PoND @ x = 2

$\xleftarrow{\quad + \quad | \quad + \quad}\rightarrow$

inc   2   inc

$\dfrac{-2}{9(x-2)^{5/3}} = \dfrac{0}{1}$

$-2 \neq 0$ No critical value

PoND @ x = 2

$\xleftarrow{\quad + \quad | \quad - \quad}\rightarrow$

↑   2   ↓

PoND @ (2, 0)

$\underline{\text{BIC}}$

$\xleftarrow{\qquad | \qquad}\rightarrow$

y' inc   2   inc

y'' ↑   ↓

Root
PoND x = 2
(2, 0)