Tuesday, October 9

TEST #2

THURSDAY, OCTOBER 11

1.6; 1.7; 1.8
2.1; 2.2; 2.3; 2.4 } not 2.5

$72x^{-1}$

$f(x) = 2x + \frac{72}{x}$ on $(0, +\infty)$ ✓

* not nec. ABS MAX
* not nec. ABS MIN

① ~~endpts~~:

② critical points:

① $f'(x) = 0$ ✓
② $f'(x)$ undef

$f'(x) = 2 - 72x^{-2} = 0$

$2 - \frac{72}{x^2} = 0$

$\frac{2}{1} = \frac{72}{x^2}$

$2x^2 = 72$

$x^2 = 36$

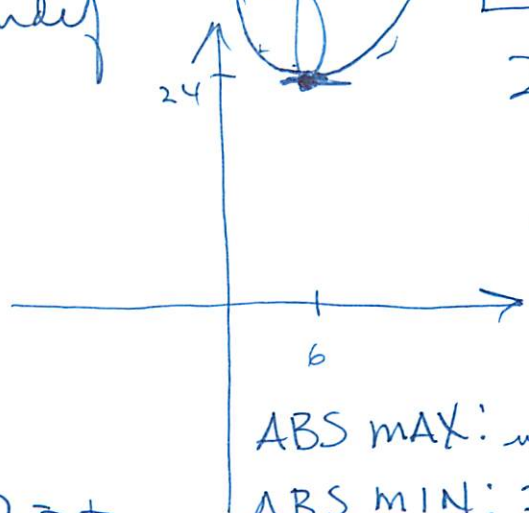
$x = +6, \cancel{-6}$

$(6, ?) = (6, 24)$

$f(6) = 2(6) + \frac{72}{6}$

$f(6) = 12 + 12 = 24$

$2 - \frac{72}{x^2}$ undef ?? when $x = \cancel{0}$



ABS MAX: none
ABS MIN: 24

$f'(x)$:

1.6: product rule; quotient rule

$y = f(x) \cdot g(x)$

$y' = f(x) \cdot g'(x) + g(x) \cdot f'(x)$

$y = \frac{f(x)}{g(x)}$

$y' = \frac{g(x) \cdot f'(x) - f(x) \cdot g'(x)}{[g(x)]^2}$

$y' = \frac{4-7}{25} = \frac{-3}{25}$

$y' = \frac{7-4}{25} = \frac{+3}{25}$

1.7: chain rule

$y = [f(x)]^n \qquad y' = n[f(x)]^{n-1} \cdot f'(x)$

$y = f(g(x)) \qquad y' = f'(g(x)) \cdot g'(x)$

1.8: higher order deriv.

$s(t) =$ ~~~~ t(sec)

$s'(t) = v(t) =$ ~~~~

$v(3) =$ ____ m/sec

dist; ht; pos

$s(3) =$ ____ meters

$s''(t) = v'(t) = a(t) =$ ____ $\frac{m/sec}{sec}$

$y = (5t-3)^8 \qquad y' = 8(5t-3)^7 \cdot 5 = 40(5t-3)^7$

$y'' = 40[7 \cdot (5t-3)^6 \cdot 5] = (40 \cdot 35) \cdot (5t-3)^6$

2.1: $f'(x)$ INFO

① critical points:

ⓐ $f'(x) = 0$ "FLAT" horizontal tangent lines

ⓑ $f'(x)$ undef. "STEEP" vertical tangent lines

② $f'(x)$ chart:

INCR / DECR

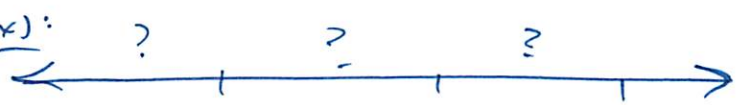
↑ $f'(x) = +$ ↑ $f'(x) = -$

2.2: $f''(x)$ INFO

① $f''(x) = 0$

② $f''(x)$ undef

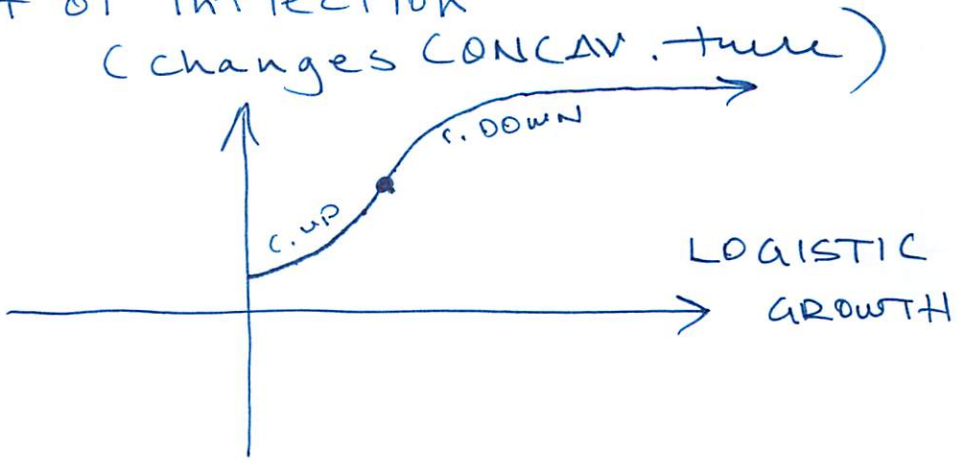
③ $f''(x)$ chart:



$f''(x) = +$ ⟶ $f(x)$ CONCAVE UP

$f''(x) = -$ ⟶ $f(x)$ CONCAVE DOWN

④ point of inflection (changes CONCAV. type)



2.3:

① vertical asymp ($x = k$)

② horiz. asymp.

$$\lim_{x \to \infty} \frac{f(x)}{g(x)} = \_\_$$

($y = \_$)

③ slant (oblique) asymp.

$$y = \frac{x^3 + \_\_ \cdot}{x^2 + \_\_ \cdot}$$

$$x^2 + \_\_ \;\overline{)\; x^3 + \_\_\_\_\_}\;\; x$$

$$-(x^3 + \_\_)$$

④ intercepts:

① x-int: (set $y = 0$)

② y-int: (set $x = 0$)

⑤ "hole" in the graph

$$y = \frac{2x+1}{5x-3} \to \frac{9}{17}$$

$$y = \frac{(2x+1)(x-4)}{(5x-3)(x-4)}$$

hole at $x = 4$

DELETE $(4, ?)$

$$\left(4, \frac{9}{17}\right)$$

⑥ y'; y'':

2.4:

on a closed interval

$f(x) =$  on $[1, 12]$

$x = 1 \dots\dots \Rightarrow x = 12$

$(1, ?)$ $(12, ?)$

$\uparrow$ $f(12)$

$f(1)$

① endpoints

② $y' = 0$; y' undef.

flat steep