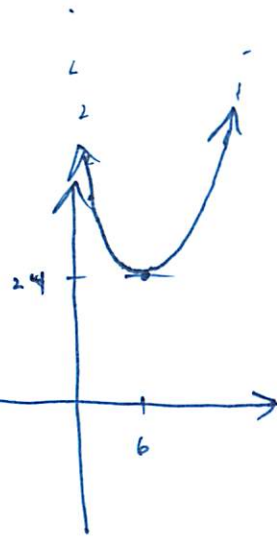


Tuesday, October 9

TEST #2

THURSDAY, OCTOBER 11

$\left. \begin{array}{l} \underline{1.6; 1.7; 1.8} \\ \underline{2.1; 2.2; 2.3; 2.4} \end{array} \right\} \underline{\underline{\text{not } 2.5}}$



2.4:

$(72x^{-1})$
↙

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

$(0, +\infty)$

not guar. MAX;
not guar. MIN

① endpoints??

② critical points:

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

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

ABS. MIN: 24
ABS. MAX: none
 $2 - \frac{72}{x}$ undef.

at $x=0$

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

$$2x^2 = 72$$

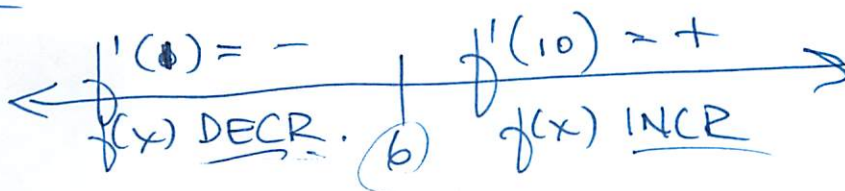
$$x^2 = 36$$

$$x = \pm 6 = \cancel{6}, 6$$

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

$$f(6) = 2(6) + \frac{72}{6} = 12 + 12 = 24$$

$f'(x)$:



1.6: product rule ; quotient rule

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

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

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

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

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

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

1.7: chain rule:

$$y = [f(x)]^k$$

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

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

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

1.8: higher order deriv:

$$y' \dot{=} y''$$

$$s(t) = \text{~~~~~} = \text{(*)} \quad s'(t) = v(t) = \text{~~~~~} \text{(*)/sec}$$

↑
dist; ht; pos

$$s''(t) = v'(t) = a(t) = \text{~~~~~} \frac{\text{ft/sec}}{\text{sec}}$$

ex: $y = (3x-8)^7$ find y'' :
 $y' = 7(3x-8)^6(3) = 21(3x-8)^6$
 $y'' = 21 \cdot 6(3x-8)^5 \cdot 3 = \text{~~~~~} (3x-8)^5$

2.1: $f'(x)$ INFO:

① CRITICAL NUMBERS

- ① $f'(x) = 0$ "FLAT" horizontal tangent lines
- ② $f'(x)$ undef. "STEEP" vertical tangent lines

② $f'(x)$ CHART

(INCR; DECR)

③ rel max/min; ABS max/min

2.2: $f''(x)$ INFO:

- ① ① $f''(x) = 0$
- ② $f''(x)$ undef.

② $f''(x)$ CHART:

(CONC. UP; CONC. DOWN)

③ point of inflection ??
change in CONCAVITY

2.3: comprehensive graphing:

- ① $f'(x)$ INFO; $f''(x)$ INFO
- ② VERT ASYM
- ③ HORIZ ASYM
- ④ SLANT (OBLIQUE) ASYM
- ⑤ "hole" in the graph
- ⑥ INTERCEPTS: $(0, ?)$; $(?, 0)$

2.4: ABS. MAX / MINI on a closed interval

$f(x) = \text{~~~~~}$ on $[a, b]$

- ① endpoints.
- ② critical points