

Calculus 5.2

#1-7 odd, 9, 11, 13-34 (thinds), 35

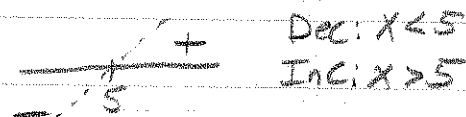
① Min: $(1, -4)$ ③ Min: — ⑤^{rel.} Min: $(-2, 1)$
 Max: — Max: $(-2, 3)$ rel. Max: $(-4, 3)$

⑦ rel. min: $(-7, -2), (-2, -2)$ 9) rel. min: 3
 rel. max: $(-4, 3)$ rel. max: -1

⑪ rel. min: -6, -1.5
 rel. max: -8, -2.5

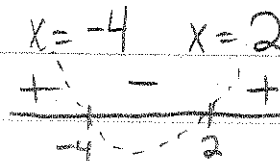
⑬ $F'(x) = 2x - 10 = 0 \Rightarrow x = 5$

Min. @ $x = 5$ $(5, 8)$



⑯ $F'(x) = 3x^2 + 6x - 24 = 0 \Rightarrow 3(x^2 + 2x - 8) = 3(x+4)(x-2) = 0$

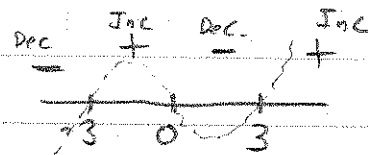
rel. max @ -4 $\Rightarrow (-4, 82)$
 rel. min @ 2 $\Rightarrow (2, -26)$



⑰ $F'(x) = 4x^3 - 36x = 0 \Rightarrow 4x(x^2 - 9) = 0$

$x = 0$ $x = -3$ $x = 3$

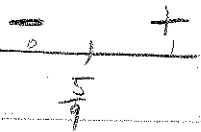
Rel. min @ $x = -3$; $(-3, -85)$
 Rel. min @ $x = 3$; $(3, -85)$
 Rel. max @ $x = 0$; $(0, -4)$



$$f(x) = \frac{1}{2}(5-9x)^{2/3} + 1$$

$$\textcircled{22} f'(x) = \frac{2}{21}(5-9x)^{-1/3}(-9) = \frac{-18}{21}(5-9x)^{-1/3} = \frac{-18}{21(5-9x)^{1/3}} = 0$$

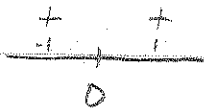
No x-value makes $f'(x) = 0$; $f'(x)$ undefined @ $x = \frac{5}{9}$



rel. min @ $x = \frac{5}{9}$; $(\frac{5}{9}, 1)$

$$\textcircled{25} f'(x) = 1 + \frac{1}{x^2} = 0$$

No x-value makes $f'(x) = 0$; $f'(x)$ undefined @ $x = 0$



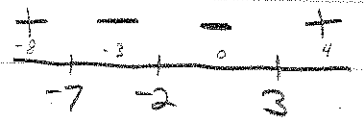
No Rel. mins or max's

$$\textcircled{28} f'(x) = \frac{(2x-6)(x+2) - (x^2-6x+9)(1)}{(x+2)^2} = \frac{2x^2-6x+4x-12-x^2+6x-9}{(x+2)^2}$$

$$f'(x) = \frac{x^2+4x-21}{(x+2)^2} = 0$$

$$\begin{aligned} x^2+4x-21 &= 0 \\ (x+7)(x-3) &= 0 \\ x &= -7 \quad x = 3 \end{aligned}$$

$f'(x)$ undefined @ $x = -2$



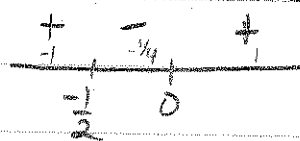
rel. max @ $x = -7$; $(-7, -20)$

rel. min @ $x = 3$; $(3, 0)$

$$\textcircled{31} f'(x) = 2 + \frac{1}{x} = 0 \Rightarrow \frac{1}{x} = -2$$

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

$f'(x)$ is undefined @ $x = 0$



$x = 0$ & $x = \frac{1}{2}$ is not in domain of $f(x)$

No relative mins or max's

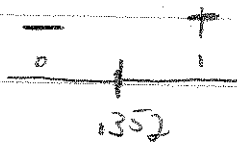
$$\textcircled{34} f'(x) = 1 + (\ln 8)(8^{-x})(-1) = 0$$

$$1 = (\ln 8)\left(\frac{1}{8^x}\right)$$

$$\frac{1}{\ln 8} = \frac{1}{8^x}$$

$$\ln 8 = 8^x$$

$$\log_8(\ln 8) = x \approx .352$$



Rel. min @ $x = .352$; $(.352, .832)$

No Rel max.

$$\textcircled{35} \frac{dy}{dx} = -4x + 12 = 0$$

$$x = 3$$

+
3
-

Vertex (3, 13)

$$y_3 = -2(3^2) + 12(3) - 5$$
$$-18 + 36 - 5 = 13$$

$$\textcircled{36} \frac{dy}{dx} = 2ax + b = 0$$

$$2ax = \frac{-b}{2a}$$

$$x = \frac{-b}{2a}$$