

HW DAY 6!

pp. 192-196 # 7, 8, 16-19, 39, 45, 46

⑦ $f(x) = 5x - 3 \ln x$ Domain $x > 0$

$$f'(x) = 5 - \frac{3}{x} = \frac{5x-3}{x}$$

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

C.P. $x = \frac{3}{5}$, $x=0$ not in domain

I.P. $x=0$ not in domain \therefore No inflection pts.

⑧ $f(x) = 4x e^{3x}$

$$f'(x) = 4e^{3x} + 4x \cdot 3e^{3x} = 4e^{3x}(1+3x) = 0$$

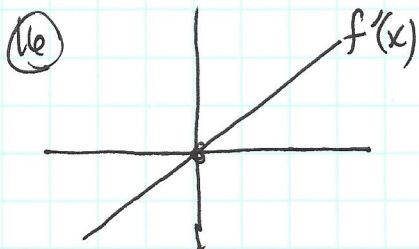
C.P. $x = -\frac{1}{3}$

$$f''(x) = 12e^{3x}(1+3x) + 4e^{3x}(3)$$

$$12e^{3x}(1+3x+1)$$

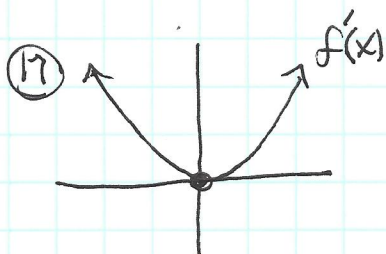
$$12e^{3x}(3x+2) = 0$$

I.P. $x = -\frac{2}{3}$



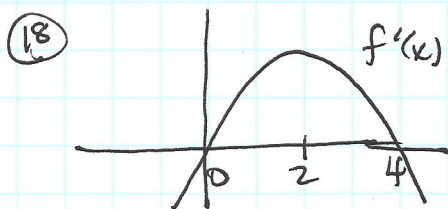
$f(x)$ is increasing on $(0, \infty)$ b/c $f'(x) > 0$
 $f(x)$ is decreasing on $(-\infty, 0)$ b/c $f'(x) < 0$.

$f(x)$ has local min $(0, f(0))$ b/c f' changes \ominus to \oplus .



$f'(x)$ is increasing on $(-\infty, 0)$ $(0, \infty)$

$f(x)$ has a terrace point at $(0, f(0))$ b/c $f'(x) > 0$ before & after $x=0$.

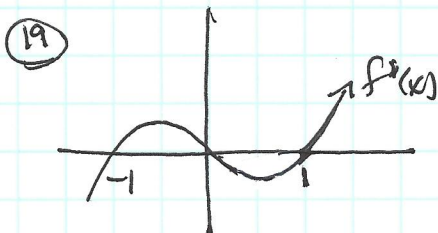


$f(x)$ is increasing on $(0, 4)$ b/c $f' > 0$

$f(x)$ is decreasing on $(-\infty, 0)$ $(4, \infty)$ b/c $f' < 0$.

$f(x)$ has local min @ $(0, f(0))$ b/c f' changes sign \ominus to \oplus

$f(x)$ has local max @ $(4, f(4))$ b/c f' changes sign \oplus to \ominus .



$f(x)$ increasing on $(-1, 0)$ $(1, \infty)$ b/c $f' > 0$

$f(x)$ decreasing on $(-\infty, -1)$ $(0, 1)$ b/c $f' < 0$

$f(x)$ has local min at $(-1, f(-1))$ & $(1, f(1))$ b/c f' changes sign \ominus to \oplus

$f(x)$ has local max at $(0, f(0))$ b/c f' changes sign \oplus to \ominus .

DAY 61 HW p.192-196 #39, 45, 46

39) $f(x) = x e^{ax}$ c.p. @ $x=3$.

$$f'(x) = e^{ax} + ax e^{ax}$$
$$e^{ax} (1+ax) = 0$$
$$1+ax = 0 \quad | \quad x=3$$
$$1+3a = 0$$
$$a = -\frac{1}{3}$$

$f(x) = x e^{-\frac{x}{3}}$

45) f	III	degree 4	even (symmetry to y-axis)	$f(-x) = f(x)$
f'	II	degree 3	odd (symmetry to origin)	$f(-x) = -f(x)$
f''	I	degree 2	even	

46) f	II	degree 5	odd
f'	III	degree 4	even
f''	I	degree 3	odd