HW 13 (part 1)

2.16 #1 A. $x' = 3t^2 - 8$

$3t^2 - 8 > 0 \Rightarrow t^2 > \frac{8}{3} \Rightarrow t > \sqrt{\frac{8}{3}} \Rightarrow t > \frac{2}{3}\sqrt{6}$ ($t > 0$ as t is time).

$(0, \frac{2}{3}\sqrt{6})$ to left

$(\frac{2}{3}\sqrt{6}, +\infty)$ to right

B. $x'' = 6t$

$t > 0 \Rightarrow 6t > 0$

$(0, +\infty)$ accelerating to the right

C. $(0, \frac{2}{3}\sqrt{6})$ slow down

$(\frac{2}{3}\sqrt{6}, +\infty)$ speed up

D. $3t^2 - 8 = 0 \Rightarrow t = \frac{2}{3}\sqrt{6}$ ($t > 0$ as t is time)

a: $6t = 4\sqrt{6}$

E. $\frac{x(6) - x(0)}{6 - 0} = \frac{(6^3 - 8 \times 6 + \cancel{8}) - (0 - 0 + \cancel{8})}{6} = 36 - 8 = 28$

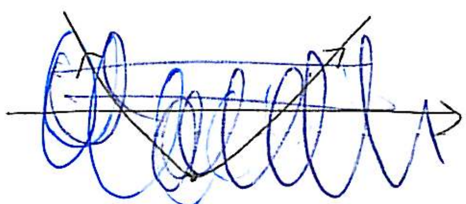
2.12 #9 $f'(x) = 13e^{x} + 13xe^{x}$

$= 13(x+1)e^{x}$

$f'(x)=0 \Rightarrow x=-1.$

$x>-1,\ f'(x)>0,\ f\ I$

$x<-1,\ f'(x)<0,\ f\ D$



$\cancel{f(-1) = -13e^{-1}+3}$

$f(-1)$
$= -13e^{-1}+3$

local max: none

absolute max: none

local min: @ $x=-1$

absolute min: @ $x=-1$

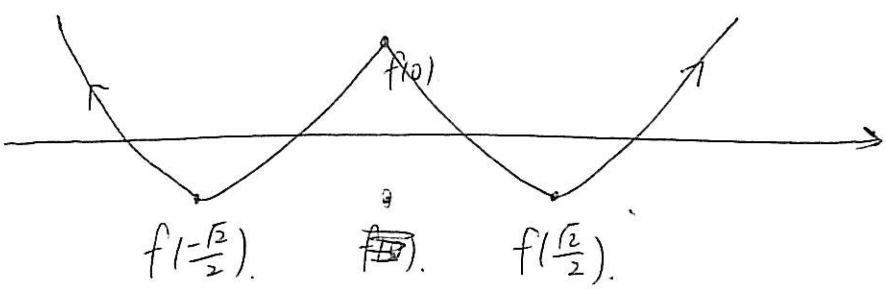
2.10 #10 $f'(x) = 4x^{3} - 2x = 2x(2x^{2}-1) = 2x(\sqrt{2}x+1)(\sqrt{2}x-1)$

$x < \frac{-\sqrt{2}}{2}$, $f'(x) < 0$, f D

$\frac{-\sqrt{2}}{2} < x < 0$, $f'(x) > 0$, f I

$0 < x < \frac{\sqrt{2}}{2}$, $f'(x) < 0$, f D

$x > \frac{\sqrt{2}}{2}$, $f'(x) > 0$, f I



local max: @ $x = 0$

absolute max: none

local min: @ $x = -\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}$.

absolute min: $f(-\frac{\sqrt{2}}{2}) = \frac{1}{4} - \frac{1}{2} - 9$

$f(\frac{\sqrt{2}}{2}) = \frac{1}{4} - \frac{1}{2} - 9$ 〉 equal.

@ $x = \frac{-\sqrt{2}}{2}, \frac{\sqrt{2}}{2}$.