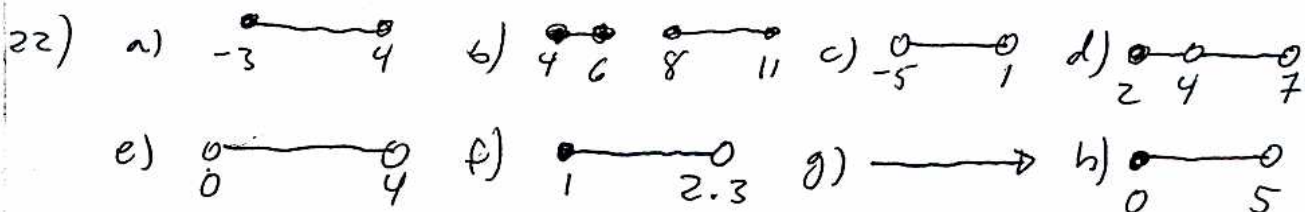


Math 251 LOZ

Math 251 Solutions to even # problems.

Appendix A 10) a) Always correct b) Not always correct (ex) $a=b=0$
 $c=1$ $d=2$
 c) Not always correct (ex) $a=1, b=2, c=d=0$



46) $\frac{x+2}{x-1} \geq 0$; $(-\infty, -2] \cup (1, +\infty)$

~~Appendix A~~ 1.2 2(b) $g(3)=2$, $g(-1)=3$, $g(w) = \sqrt{w+1}$ $g(-1.1)=3$

$g(t^2-1)=3$ if $t^2 < 2$ and $g(t^2-1)=|t|$ if $t^2 > 2$

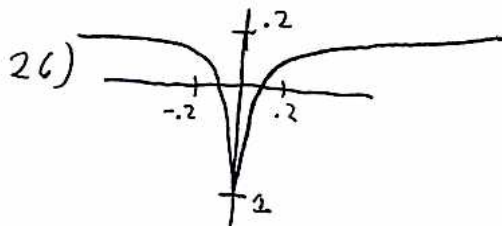
4(c) $\frac{x^2-4}{x-4} > 0$ thus $-2 < x < 2$

14(a) $f(x) = \begin{cases} 8-2x & , x < 5/2 \\ 2x-2 & , x \geq 5/2 \end{cases}$

1.4 62) $\frac{-(x+w)}{x^2w^2}$

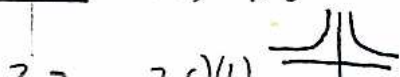
2.1 (10) a) 1 b) $-\infty$ c) DNE d) -2 e) $+\infty$ f) $+\infty$

2.2 24) $v_{ave} \approx 5 \text{ ft/s}$ [also v_{inst} b/c it is independent of Δt]



2.5 24) $\lim_{x \rightarrow 1} \frac{1}{x-1} = \text{DNE} \Rightarrow \text{discont. @ } x=1$

2.6 42) No



3.2 (44) f cont. @ $x=1$, but $f'(1)$ DNE

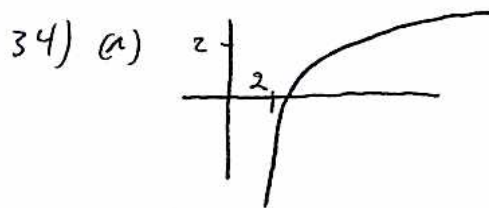
3.3 6) $-\sqrt{2}$ 22) $\frac{dy}{dx} = -3/(2\sqrt{x}(\sqrt{x}+2)^2)$, $y'(1) = -1/6$

26) $\frac{dy}{dx} = \frac{7}{(x+3)^2}$ $y'(1) = \frac{13}{8}$ 84) $f''(2) = 3584$

3.5 68) (a) 0 (b) 0 (use 67(a)) (c) $2x \sin(1/x) - \cos(1/x)$, $x \neq 0$

(d) If $f'(x)$ were cont. @ $x=0$, then so would $\cos(1/x) = f'(x) - 2x \sin(1/x)$, since $2x \sin(1/x)$ is cont. there. But $\cos(1/x)$ oscillates at $x=0$.

4.2 6) (a) 4 (b) -5 (c) 1 (d) $1/2$ 18) $x = \pm e^2$



4.3 42) $y' = \pi^{x \tan x} (\ln \pi) (x \sec^2 x + \tan x)$

44) $y' = x^{\sin x} \left[\frac{\sin x}{x} + (\cos x) \ln x \right]$

4.5 8) -1 12) $+\infty$

5.1 26) $f'(x) = x(2 \ln x + 1)$ (a) $[e^{-1/2}, \infty)$ (b) $[0, e^{-1/2}]$ (c) $(e^{-3/2}, \infty)$

$f''(x) = 2 \ln x + 3$ (d) $(0, e^{-3/2})$ (e) $e^{-3/2}$

5.2 36) rel min of 0 @ $x=0$, rel max of $4/e^2$ @ $x=-2$

5.4 34) $s = t^3 - 6t^2 + 1$, $r = 3t^2 - 12t$, $a = 6t - 12$

(a) $a=0$ @ $t=0$, $s = -15$, $r = -12$

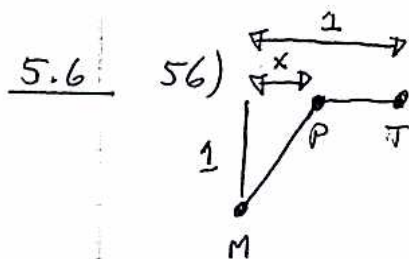
(b) $r=0$ when $3t^2 - 12t = 0$ i.e. $t=0, 4$

if $t=0 \Rightarrow s=1$, $a=-12$.

if $t=4 \Rightarrow s=-31$, $a=12$

5.5 10) $\text{Max} = 12^{2/3}$ @ $x=3$, $\text{Min} = 0$ @ $x=-1, 0$

16) Min: None Max: $f(-1) = 5$



(a) time is min when $x = 3/4$ mile

(b) time is min when $x = 1$

5.8 26) $f(0) = f(1) = 0$, by Rolle's $f'(c) = 0$ for some $c \in (0, 1)$

34) By contradiction to Rolle's, $f(x) = 0$ has less than 2 distinct solutions.

6.3 26) $\ln|e^x - e^{-x}| + C$ 46) $\frac{2}{3}(y+1)^{3/2} - 2(y+1)^{1/2} + C$

52) $\ln|\sin x| + C$

6.6 20) $(\ln 2)/2$ 40) $1/6$

6.7 38) $v = -10t + 88$, $t \geq 0$

(a) $66 = -10t + 88$, $t = 2.2$ s

(b) $s = -5t^2 + 88t$ [$s=0$, @ $t=0$, so $C_2=0$]

$t = 8.8 \Rightarrow s = 387.2$ ft.

6.8 46) $8/3$ 48) $(e^{-1} - e^{-2})/2$