Name: PROM

Wednesday, February 06, 2008
10:34 AM

11 $f(u) = \dfrac{u^4 + 3\sqrt{u}}{u^2}$

$f(u) = u^2 + 3u^{-3/2}$

$F(u) = \frac{1}{3}u^3 - 6u^{-1/2} + C$

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14 $h(\theta) = \dfrac{\sin\theta}{\cos^2\theta}$

$h(\theta) = \dfrac{\sin\theta}{\cos\theta} \cdot \dfrac{1}{\cos\theta} = \tan\theta \sec\theta$

$H(\theta) = \sec\theta + C$

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9 $f(x) = \dfrac{10}{x^9} = 10x^{-9}$

$F(x) = -\frac{5}{4}x^{-8} + C$

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15 $f(x) = 2x + 5(1-x^2)^{-\frac{1}{2}}$

$= 2x + \dfrac{5}{\sqrt{1-x^2}} = 2x + 5 \cdot \dfrac{1}{\sqrt{1-x^2}}$

$F(x) = x^2 + 5\sin^{-1}(x) + C$

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33 $f''(x) = 24x^2 + 2x + 10$ $\quad f(1) = 5 \quad f'(1) = -3$

$f'(x) = 8x^3 + x^2 + 10x + C$

$f'(1) = 8(1)^3 + (1)^2 + 10(1) + C = -3$

$C = -22$

$f(x) = 2x^4 + \frac{1}{3}x^3 + 5x^2 - 22x + D$

$f(1) = 2(1)^4 + \frac{1}{3}(1)^3 + \cancel{5}(1)^2 - 22(1) + D = \cancel{5}$

$D = 22 - 2 - \frac{1}{3}$

$D = 19\frac{2}{3}$

$$f(x) = 2x^4 + \frac{1}{3}x^3 + 5x^2 - 22x + 19\frac{2}{3}$$

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30 $f'(x) = 3x^{-2}$ $\qquad f(1) = f(-1) = 0$

$$f(x) = -3x^{-1} + C$$

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

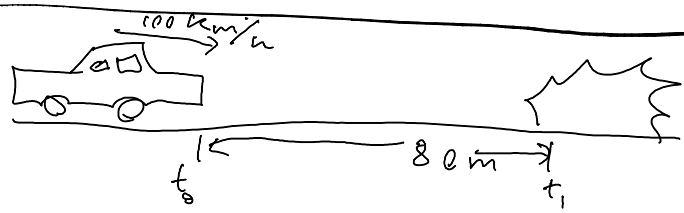
$$C = 3$$

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

$$C = -3$$

$$f(x) = \begin{cases} -3x^{-1} + 3 & x = 1 \\ -3x^{-1} - 3 & x = -1 \end{cases}$$

72



$$V(t_0) = 100 \text{ km/h}$$

$$V(t_1) = 0 \text{ km/h}$$

$$S(t_1) < 80 \text{ m} \Rightarrow .08 \text{ km}$$

$$S(t_0) = 0 \text{ m}$$

$a(t) = k$ $\qquad$ k is a constant

$$V(t) = kt + C$$

$$S(t) = \frac{1}{2}kt^2 + Ct + D$$

$$V(t_0) = 100 = k(0) + C$$

$$100 = 0 + C$$

$$C = 0$$

$$S(t_0) = \frac{1}{2}k(0)^2 + C(0) + D$$

$$D = 0$$

$$S(t) = \frac{1}{2}kt^2 + 100t$$

$V(t_1) = 0 = kt_1 + 100$ $\qquad t_1 = \frac{-100}{k}$

$V(t_1) = 0 = kt_1 + 100 \qquad t_1 = \frac{-100}{k}$

$S(k) = \frac{\cancel{k}}{2}\left(-\frac{100}{k}\right)^2 + 100\left(\frac{-100}{k}\right) = \left(\frac{-100}{k}\right)\left[\frac{\cancel{k}}{2}\cdot\frac{\overset{-50}{\cancel{-100}}}{\cancel{k}} + 100\right]$

$= \frac{-5000}{k} < .08$

$k \geq -62500 \ km/h^2$

2/6/08 Review

Pg 362 #3 find absolute and local extreme

$f(x) = \frac{x}{x^2+x+1}, \ [-2,0]$

$f'(x) = \frac{x^2+x+1-2x^2-x}{(x^2+x+1)^2}$

$= \frac{-x^2+1}{(x^2+x+1)^2}$

$0 = -x^2+1$

$x = \pm 1$

$1 \notin$ Domain

First Der. test: $\ominus$ -1 $\oplus$

Min.

$f(-1) = \frac{-1}{1+-1+1} = -1$

$f(-2) = \frac{-2}{4+-2+1} = \frac{-2}{3}$

$f(0) = \frac{0}{1} = 0$

Abs. max $(0,0)$

Abs. min $(-1,-1)$

#13 $\lim_{x\to 1^+}\left(\frac{x}{x-1} \xrightarrow{} \frac{1}{0} - \frac{1}{\ln x} \xrightarrow{} \frac{1}{0}\right)$

$\lim_{x\to 1^+}\left(\frac{x\ln x - (x-1)}{\ln x(x-1)}\right) \to \frac{0}{0}$

$\lim_{x\to 1^+} \frac{\ln x + \cancel{x\left(\frac{1}{x}\right)} - \cancel{1}}{\frac{1}{x}(x-1) + \ln x} = \frac{\ln(x)}{\frac{x-1}{x}+\ln x}$

$= \frac{\ln x}{\frac{x-1+x\ln x}{x}} = \left[\frac{x\ln x \to 0}{\underset{\downarrow 0}{x-1} + \underset{\downarrow 0}{x\ln x}}\right] \to \frac{0}{0}$

$\lim \frac{\ln x + x\frac{1}{x}}{} = \ln x + 1 - \frac{1}{}$

$x \to 1^{+}$ $\qquad 1 + \ln x + x\frac{1}{x} \qquad \ln x + 2 \qquad 2$