4.3 HW #9

$f(x) = 2\sin x + 2\cos x$; $[0, \frac{\pi}{2}]$

Critical points

$f'(x) = 2\cos x - 2\sin x = 0$

$2\cos x - 2\sin x = 0$

$\sin x = \cos x$

$\tan x = 1$; $x = \frac{\pi}{4}$

$f(\frac{\pi}{4}) = 2\sqrt{2}$

$2 \cdot \frac{\sqrt{2}}{2} + 2 \cdot \frac{\sqrt{2}}{2}$

$f(x) = 2\sin x + 2\cos x$ $f(0) = 2$; $f(\frac{\pi}{2}) = 2$

$x = 0$; $\frac{\pi}{2}$

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4.3.6 $y = x^{\frac{3}{2}} - 3x^{\frac{5}{2}}$

$y' = \frac{3}{2}x^{\frac{1}{2}} - \frac{15}{2}x^{\frac{3}{2}} = 0$

$x^{\frac{1}{2}}\left(\frac{3}{2} - \frac{15}{2}x\right) = 0$

$x^{\frac{1}{2}} = 0$ $x = 0$

or $\frac{3}{2} - \frac{15}{2}x = 0$

$\frac{15}{2}x = \frac{3}{2}$ $x = \frac{1}{5}$

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$f(x) = 2\sqrt{x^2+1} - x$; $[0, 5]$ Domain $(-\infty, \infty)$

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

$= \frac{2x}{\sqrt{x^2+1}} - 1 = 0$

$\frac{2x}{\sqrt{x^2+1}} = 1$

$(2x)^2 = \left(\sqrt{x^2+1}\right)^2$

$4x^2 = x^2 + 1$

$3x^2 = 1$

$x^2 = \frac{1}{3}$

$x = \frac{1}{\sqrt{3}}$ or $x = \frac{-1}{\sqrt{3}}$

$x = \frac{1}{\sqrt{3}}$ is the cri

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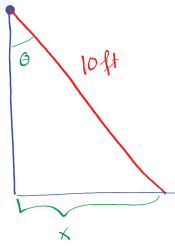
Practice Exam #4

$\frac{dx}{d\theta} = ?$ when $\theta = \frac{\pi}{3}$



$\sin\theta = \frac{x}{10}$

$x = 10\sin\theta$

$\frac{dx}{d\theta} = 10\cos\theta$

$\frac{dx}{d\theta} = 10 \cdot \cos\frac{\pi}{3} = 5$.

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$y = \frac{1 - \sec x}{\tan x}$ $\frac{dy}{dx} = ?$

$\frac{dy}{dx} = \frac{(-\sec x \tan x) \cdot \tan x - \sec^2 x \cdot (1 - \sec x)}{\tan^2 x}$

$= \frac{-\sec x \tan^2 x - \sec^2 x + \sec^3 x}{\tan^2 x}$

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

$1 + \tan^2 x = \sec^2 x$

$\sin^2 x + \cos^2 x = 1$

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