Math 124 C - Spring 2010
Mid-Term Exam Number Two
May 18, 2010
Answers

There were two versions of the exam.
Version A - Problem 1(b) involves $43°$.

1. (a) $\cos x \approx \frac{1}{\sqrt{2}} - \frac{1}{\sqrt{2}}\left(x - \frac{\pi}{4}\right)$ (b) $\cos 43° \approx 0.731789$

2. $y = -\dfrac{39}{55}(x-2) + 3$

3. (a) $\dfrac{dy}{dx} = e^{\ln x \cos x}\left(\dfrac{1}{x}\cos x - \ln x \sin x\right)$ (b) $\dfrac{dy}{dx} = \tan^{-1}\dfrac{1}{x} + \dfrac{x}{\left(\frac{1}{x}\right)^2 + 1}\left(-\dfrac{1}{x^2}\right)$

   (c) $\dfrac{dy}{dx} = \dfrac{\ln y - \frac{y}{x}}{\ln x - \frac{x}{y}}$

4. 26703.5 cm^3/min

5. 0.268 m/sec

6. (a) $a = 3, b = 5$ (b) $-6\sin 2$ (c) $10\cos 4$ (d) $t = -0.515188$

Version B - Problem 1(b) involves $46°$.

1. (a)$\cos x \approx \frac{1}{\sqrt{2}} - \frac{1}{\sqrt{2}}\left(x - \frac{\pi}{4}\right)$ (b) $\cos 46° \approx 0.694765$

2. $y = -\dfrac{47}{13}(x-4) + 1$

3. (a) $\dfrac{dy}{dx} = e^{\ln x \cos x}\left(\dfrac{1}{x}\cos x - \ln x \sin x\right)$ (b) $\dfrac{dy}{dx} = \dfrac{\ln y - \frac{y}{x}}{\ln x - \frac{x}{y}}$

   (c) $\dfrac{dy}{dx} = \tan^{-1}\dfrac{1}{x} + \dfrac{x}{\left(\frac{1}{x}\right)^2 + 1}\left(-\dfrac{1}{x^2}\right)$

4. 21362.8 cm^3/min

5. 0.16636 m/sec

6. (a) $a = 6, b = 4$ (b) $-12\sin 6$ (c) $8\cos 2$ (d) $t = -0.2940013$