Answer Key 1

MATH 10560: Calculus II   **Practice Exam 1.1**   *September 23, 2009*

Record your answers to the multiple choice problems by placing an × through one letter for each problem on this page. There are 12 multiple choice questions worth 7 points each. You start with 16 points.

You may not use a calculator.

1. a | ● | c | d | e

2. a | b | ● | d | e

3. a | b | c | d | ●

4. a | ● | c | d | e

5. a | ● | c | d | e

6. a | b | c | ● | e

7. a | b | ● | d | e

8. a | b | ● | d | e

9. a | b | ● | d | e

10. ● | b | c | d | e

11. ● | b | c | d | e

12. a | b | c | ● | e

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1. ☐a ☐b ☐c ☐d ☐e   7. ☐a ☐b ☐c ☐d ☐e

2. ☐a ☐b ☐c ☐d ☐e   8. ☐a ☐b ☐c ☐d ☐e

3. ☐a ☐b ☐c ☐d ☐e   9. ☐a ☐b ☐c ☐d ☐e

4. ☐a ☐b ☐c ☐d ☐e   10. ☐a ☐b ☐c ☐d ☐e

5. ☐a ☐b ☐c ☐d ☐e   11. ☐a ☐b ☐c ☐d ☐e

6. ☐a ☐b ☐c ☐d ☐e   12. ☐a ☐b ☐c ☐d ☐e

1. Simplify $\tan(\sin^{-1}(x))$.

(a) $\dfrac{1}{1+x^2}$ (b) $\dfrac{x}{\sqrt{1-x^2}}$ (c) $\dfrac{\sqrt{1+x^2}}{x}$ (d) $\dfrac{x}{\sqrt{1+x^2}}$ (e) $\dfrac{\sqrt{1-x^2}}{x}$

2. Use integration by parts to evaluate $\displaystyle\int_0^1 x\,3^x\,dx$.

(a) $\dfrac{\ln 3 - 1}{(\ln 3)^2}$ (b) $\dfrac{1}{\ln 3}$ (c) $\dfrac{3\ln 3 - 2}{(\ln 3)^2}$ (d) 1 (e) $\dfrac{3}{\ln 3} - 2$

3. The half-life of bismuth-210 is 5 days. A sample originally has a mass of 100 mg. Determine the number of days it will take for the mass to be reduced to 1 mg.

(a) $\dfrac{\ln(2)}{5}$ (b) $\dfrac{\ln(100)}{5}$ (c) $-\dfrac{\ln(.01)}{5\ln(2)}$ (d) $50\ln(2)$ (e) $\dfrac{5\ln(.01)}{\ln(.5)}$

4. If $a > 0$ and $\cosh(a) = 2$, find $\sinh(a)$.

(a) $\sqrt{5}$ (b) $\sqrt{3}$ (c) $1/2$ (d) $\sqrt{2}$ (e) 1

5. Simplify $\dfrac{\log_{10}(50)}{1 + \log_{10}(5)}$.

(a) $\log_{10}(5)$ (b) 1 (c) $\dfrac{1}{\log_{10}(5)}$

(d) $\dfrac{1}{2}$ (e) $\dfrac{1}{1 - \log_{10}(5)}$

6. Let $f(x) = x + \sqrt{x}$ for $x \geq 0$. Find $(f^{-1})'(2)$.

(a) 1   (b) 3/4   (c) 1/2   (d) 2/3   (e) 1/3

7. Use a trigonometric substitution to evaluate $\displaystyle\int_1^{\sqrt{3}} \frac{1}{x^2\sqrt{1+x^2}}\, dx$.

(a) $1 - \dfrac{1}{\sqrt{3}}$ (b) $\dfrac{\sqrt{3}}{\sqrt{2}}$ (c) $\sqrt{2} - \dfrac{2}{\sqrt{3}}$ (d) $\dfrac{\sqrt{3}}{\sqrt{2}} - 1$ (e) $1 - \dfrac{1}{\sqrt{2}}$

8. Determine the *largest* interval around 0 where $f(x) = \sin(x) + \cos(x)$ is one-to-one.

(a) $\left[-\dfrac{\pi}{2}, \dfrac{\pi}{2}\right]$ (b) $\left[-\dfrac{2\pi}{3}, \dfrac{2\pi}{3}\right]$ (c) $\left[-\dfrac{3\pi}{4}, \dfrac{\pi}{4}\right]$ (d) $\left[-\dfrac{\pi}{4}, \dfrac{\pi}{4}\right]$ (e) $\left[-\dfrac{2\pi}{3}, \dfrac{\pi}{3}\right]$

9. Evaluate $\displaystyle\int_0^{\pi/2} \sin^7(x)\cos^3(x)\, dx$.

(a) 1/4   (b) 1/32   (c) 1/40   (d) 1/20   (e) 1/8

10. Compute $\dfrac{d}{dx}\cos(x)^x$.

(a) $\cos(x)^x(\ln(\cos(x)) - x\tan(x))$ (b) $x\cos(x)^{x-1}$

(c) $-\sin(x)^x + \cos(x)^x \ln(\cos(x))$ (d) $\cos(x)^x(\ln(\cos(x)) - x\sin(x))$

(e) $-x\cos(x)^{x-1}\sin(x)$

11. Evaluate $\int_0^1 \dfrac{x}{1+x^4}\,dx$.

(a) $\dfrac{\pi}{8}$ (b) $\dfrac{\pi}{4}$ (c) $\dfrac{\pi}{2}$ (d) $\dfrac{3\pi}{4}$ (e) $\dfrac{3\pi}{2}$

12. Calculate $\lim\limits_{x \to 0^+} \ln(x)\sin(x)$.

(a) $-\infty$ (b) 1 (c) e (d) 0 (e) $1/e$