Calculus I Fall 2009 **Test 4 (Practice Version)**

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Circle the letter for your final answer. Show your work. Calculators are not allowed.

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1. Evaluate $\int 2x^3 - 7x + e^x + 1 \; dx$.

a) $x^4 - \frac{7}{2}x^2 + \frac{1}{x+1}e^{x+1} + 2x + C$ b) $\frac{1}{2}x^4 - 7x^2 + e^x + x + C$

c) $\frac{1}{4}x^4 - 7x^2 + x + e^{x+1} + C$ d) $\frac{1}{2}x^4 - \frac{7}{2}x^2 + e^x + x + C$ e) $\frac{1}{2}x^4 - \frac{7}{2}x^2 + \frac{1}{x+1}e^{x+1} + x + C$

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2. Which of these is an antiderivative of $2\sqrt{x} - \dfrac{4}{x}$?

a) $3\sqrt{x^3} - 4\ln|x| + 2\ln 3$ b) $x^{1/2} - 4\ln x + 3$

c) $3x^{3/2} + \dfrac{4}{x^2}$ d) $\sqrt{x^3} + 4\ln|x| + x$ e) $3\sqrt{x^3} + \dfrac{2}{x^2} - \pi$

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3. Evaluate $\displaystyle\int_{1/2}^{\sqrt{3}/2} \frac{1}{\sqrt{1-x^2}}\, dx$.

a) π b) $\dfrac{\pi}{6}$ c) $\dfrac{\pi}{4}$ d) $\dfrac{\pi}{3}$ e) $\dfrac{\pi}{2}$

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4. Find $\dfrac{d}{dx}\left[\displaystyle\int_9^{x^2} e^{t^2}\, dt\right]$.

a) $e^{x^4} - e^{81}$ b) $2xe^{t^2}$

c) $x^2e^{x^4} - 9e^8$ d) $2xe^{x^4}$ e) $2xe^{x^4} - e^{81}$

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5. Suppose $f'(t) = t^2 - 7$ and $f(3) = -10$. Find $f(t)$.

a) $f(t) = \dfrac{t^3}{3} - 7t + 2$ b) $f(t) = \dfrac{t^3}{3} - 7t + C$

c) $f(t) = \dfrac{t^3}{3} - 7t - 10$ d) $f(t) = \dfrac{t^3}{3} + 7t - 40$ e) $f(t) = \dfrac{t^3}{3} + 7t - 10$

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6. Evaluate $\displaystyle\int 2x^3 \cos(x^4)\, dx$.

a) $\dfrac{1}{2}\cos(x^4) + C$ b) $\dfrac{1}{2}\sin(x^4) + C$

c) $\dfrac{1}{2}x^4 \sin\left(\dfrac{1}{5}x^5\right) + C$ d) $\dfrac{1}{3}\sin(x^4/5) + C$ e) $\dfrac{1}{4}x^3\cos(x^4) + C$

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7. Evaluate $\int \frac{x^2+1}{\sqrt{x}}\,dx$. (Hint: Don't try substitution...)

a) $\frac{1}{2}\sqrt{x} - \frac{1}{2}x^{-3/2} + C$ b) $\frac{x^3+x}{x} + C$

c) $\frac{2}{5}x^{5/2} + 2\sqrt{x} + C$ d) $\frac{2}{3}x^{3/2} + 2x^{-1/2} + C$ e) $\frac{x}{(1/2)x^{-1/2}} + C$

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8. Recall that "net area" is the total area above the x-axis subtracted by the total area under the x-axis. Find the net area bounded by the curve $y = 3x^2 - 3$ and the x-axis from $x = -2$ to $x = 1$.

a) -4 b) 0 c) 4 d) 8 e) 16

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9. (Worth double.) Find the total area bounded by the curve $y = 3x^2 - 3$ and the x-axis from $x = -2$ to $x = 1$.

a) -4 b) 0 c) 4 d) 8 e) 16

10. (Worth double.) Evaluate $\int \frac{3\sec(y) + 3y\sec(y)\tan(y)}{2 + y\sec(y)}\, dy$.

a) $3\ln(u) + C$ b) $3\ln|2 + y\sec(y)| + C$ c) $\sec(y)\tan(y)\sin(y)\cos(y) + C$

d) $3\sec(y) + 3y\sec(y)\tan(y) + C$ e) $2y + y\sec(y)\tan(y) + C$

11. (Worth double.) Find the total area bounded by the curves $g(x) = 6x^3 - 24x + 1$ and $h(x) = 8x - 2x^3 + 1$.

a) 0 b) 8 c) 16 d) 32 e) 64

12. (Worth double.) $g'(x) = 6(3x^2 + 4x)(x^3 + 2x^2 - 1)^5$ and $g(0) = 3$. Find $g(x)$.

a) $g(x) = (x^3 + 2x^2 - 1)^6 + 2$ b) $g(x) = (3x^2 + 4x)^6 + 2$

c) $g(x) = (x^3 + 2x^2 - 1)^6 - 2$ d) $g(x) = (3x^2 + 4x)^6 - 2$ e) $g(x) = (x^3 + 2x^2)^6$