Math 131 **Exam 4 (Final Exam)** **F04M131.4.1**

Name _____ **ID Number** _____

The exam consists of 18 multiple choice questions (5 points each) and 10 true/false questions (1 point each), for a total of 100 points. Mark the correct answer on the answer card. Only the answer on the card will be graded.

1. We begin with 20g of a certain radioactive isotope. As it decays, the amount remaining at time t (hrs) is $A = 20e^{-0.08t}$. What is its rate of decay at time $t = 8$? (*Round your answer to 2 decimal places.*)

A) -0.21 g/hr B) -0.33 g/hr C) -0.38 g/hr
D) -0.48 g/hr E) -0.76 g/hr F) -0.84 g/hr
G) -0.89 g/hr H) -0.94 g/hr I) -0.98 g/hr
J) -1.03 g/hr

2. If $\int_0^7 g(x)\,dx = 20$, $\int_4^7 g(x)\,dx = 4$, and $\int_0^1 g(x)\,dx = 7$, then what is $\int_1^4 g(x)\,dx$?

A) 10 B) 9 C) 11 D) 7 E) 6
F) 16 G) 23 H) 13 I) 8 J) 27

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3. If $y = \sin^2(2x) + (x - \frac{\pi}{2})\tan(2x)$, what is the slope of the tangent line to the graph at $(0, 0)$?

A) $-\frac{\pi}{2}$ B) $\frac{1}{2}$ C) $\frac{\pi}{4}$ D) $2 + \frac{\pi}{2}$ E) $-\pi$
F) 2π G) 0 H) -1 I) 2 J) -2

4. For a certain gas held inside a container, the pressure and volume are related by the equation $PV = 1$. Use a differential to estimate the change in pressure when the volume decreases from 10 cm^3 to 9.5 cm^3. (*Round your answer to 4 decimal places.*)

A) -0.0047 B) -0.0042 C) 0.0142 D) 0.0148
E) 0.0050 F) 0.0053 G) -0.1673 H) -0.1610
I) 0.5712 J) 5.1314

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5. At time t, the velocity of a point moving along a line is $t^2(t^3+1)^7$ m/sec. At time $t=-1$, the point is at position 0. What is its position when $t=0$?

A) $\frac{1}{50}$ m B) 1 m C) $\frac{1}{2}$ m D) $\frac{1}{24}$ m E) 2 m
F) $-\frac{1}{2}$ m G) -1 m H) -2 m I) $\frac{5}{2}$ m J) $\frac{1}{8}$ m

6. If $f(x)=\ln\left(\frac{(x^2+1)}{\sqrt[5]{\cos x}}\right)$, what is $f'(1)$?

A) 0 B) $\ln(2)$ C) $\tan(1)$ D) 0

E) $1+\frac{1}{5}\tan(1)$ F) $1+\frac{1}{5}\sin(1)$ G) $\frac{1}{5}\sin(1)$

H) $\frac{2}{\sqrt[5]{\cos(1)}}$ I) $-\frac{1}{5}\ln\left(\frac{2}{\sin(1)}\right)$ J) $\ln(\tan(1))$