CALCULUS 101A    CHATER 5 TEST    NAME:

Find the indefinite integral in Problems 1-8 (6 pts. ea)

1. \( \int x^2 e^{-4x^3} \, dx \)
2. \( \int (2x + 5)(x^2 + 5x^7) \, dx \)
3. \( \int \frac{5x^3}{3x^3 + 1} \, dx \)
4. \( \int (\sin^3 x) \cos x \, dx \)
5. \( \int (\sec^2 x)(\tan^2 x) \, dx \)
6. \( \int \frac{x^3 + 8}{x + 2} \, dx \)
7. \( \int (\sin^5 x) \, dx \)
8. \( \int \frac{\cos(\ln x)}{x} \, dx \)

9. Use the definition of the definite integral to evaluate: (12 pts.)

\[ \int_0^2 (3x^2 + 2x) \, dx \]

Evaluate the definite integrals. Problems 10-12.

10. \( \int_0^2 x^3 \sqrt{16 - x^4} \, dx \) (8 pts.)

11. \( \int_0^3 \frac{e^x - e^{-x}}{e^x + e^{-x}} \, dx \) (8 pts.)

12. Evaluate: \( \frac{d}{dx} \int_2^{5t^2 - 3} dt \) (6 pts.)

13. Find the average value of \( f(x) = (x^4 - 3x^3) \) on the interval \([-2, 2]\). (8 pts.)

14. Use \( a(t) = -32 \text{ ft/sec}^2 \) as the acceleration due to gravity. An object is thrown vertically downward from the top of a 480-foot building with an initial velocity of 64 feet per second; with what velocity does the object hit the ground? (10 pts.)