review1 (Answer Key)   **Name & Box Number:**

This is only some of the questions done in class and you should review all other necessary materials as well.

1. Use integration by substitution to solve the integral below. Use C for the constant of integration.

$$\int -7x^2\sqrt{5x^3 + 2}\,dx$$

Answer: _____

2. Use an appropriate u-substitution to evaluate the indefinite integral $\int \left(3 + \frac{1}{t}\right)^5 \frac{1}{t^2}\,dt$. Use C for the constant of integration.

Answer: _____

3. Evaluate the definite integral below.

$$\int_{-5}^{1} (8(8x + 3)^4)\,dx$$

Enter your answer in exact form or rounded to two decimal places.

Answer: _____

4. Find the area of the region bounded by the graphs of the given equations.
$$y = x^2 - 10x - 46, \; y = -x^2 + 2$$

Answer: _____

5. Evaluate the definite integral $\int_{\frac{1}{8}}^{\frac{1}{4}} 6\cos^{-1}(4x)\,dx$. Use integration by parts only if necessary. Write the exact answer. Do not round.

Answer: _____

6. Evaluate the integral $\int 5x\ln(3x^2)\,dx$. Use C for the constant of integration. Write the exact answer. Do not round. (**Hint:** Use an alternative method if integration by parts is not required.)

Answer: _____

7. Apply the partial fractions method to evaluate the integral $\int \frac{16x+14}{x(x^2-5x-14)}dx$. Use C for the constant of integration. Write the exact answer. Do not round.

Answer: _____

8. Apply any of the techniques of determining the partial fraction constants to evaluate the integral $\int_7^{20} \frac{dx}{x^2-36}$. Write the exact answer. Do not round. (**Hint:** If the integrand is not a proper rational function, be sure to divide first.)

Answer: _____

9. Evaluate the indefinite integral $\int 4\tan(5x)\sec^6(5x)dx$. Use C for the constant of integration. Write the exact answer. Do not round.

Answer: _____

10. Evaluate the indefinite integral $\int 3\sin^4(9x)dx$. Use C for the constant of integration. Write the exact answer. Do not round.

Answer: _____

11. Choose the substitution(s) that are helpful in evaluating the integral $\int 5x\sqrt{36-x^2}dx$. Do not actually evaluate the integral. Select all answers that apply.

A) $x = 6\tan\theta$
B) $x = 6\sin\theta$
C) $\theta = 36 - x^2$
D) $x = 6\sec\theta$
E) $\theta = \sqrt{36-x^2}$
F) $\theta = 6\sin x$

12. Find the arc length of the parabola $y = 9x^2$ between the origin and the point $(1,9)$. Round any intermediate calculations, if needed, to no less than six decimal places, and round your final answer to three decimal places.

Answer: $L \approx$_____

13. Evaluate $\int \frac{55}{\sqrt{z+5}+\sqrt{z}}dz$. Whenever possible, try to simplify before integrating. Use C for the constant of integration. Write the exact answer. Do not round.

Answer: _____

14. Transform the following integral into a form you can integrate and then evaluate. Use C for the constant of integration. Write the exact answer. Do not round.

$$\int \frac{dx}{x\sqrt{5x^2 + 36}}$$

Answer: _____

15. Use the Trapezoidal Rule to estimate the amount of water needed to raise the water level by two inches in a free-form pool. Measured at 2-foot intervals from one edge of the pool to the other edge, the distances across the pool (in feet) are the following: 1, 7, 10, 12, 13, 12, 10, 9, 8, 7, 6, 4. Write the exact answer. Do not round.

Answer: _____ cubic feet

16. Perform the substitution $u = 7x$ to evaluate the indefinite integral $\int \frac{21}{49x^2+1} dx$. Use C for the constant of integration.

Answer: _____

17. Evaluate the definite integral below.

$$\int_{-2}^{-1} \left(-4x - \tfrac{20}{3}\right)(3x^2 + 10x + 4)^2 dx$$

Enter your answer in exact form or rounded to two decimal places.

Answer: _____

18. Use integration by parts to evaluate the integral $\int x^6 \ln(\ x\ ) dx$. Use C for the constant of integration.

Answer: _____

19. Apply the partial fractions method to evaluate the integral $\int \frac{2-2z}{z(z+1)^2} dz$. Use C for the constant of integration. Write the exact answer. Do not round.

Answer: _____

20. Evaluate the indefinite integral $\int 4\tan(7x)\sec^6(7x)dx$. Use C for the constant of integration. Write the exact answer. Do not round.

Answer: _____

21. Use the three trigonometric substitutions (if required) to evaluate $\int \frac{3dt}{\sqrt{16t^2-81}}$. Use C for the constant of integration. Write the exact answer. Do not round.

Answer: _____

22. Transform the following integral into a form you can integrate and then evaluate. Use C for the constant of integration. Write the exact answer. Do not round.

$$\int \frac{7\tan u}{\cos^2 u\sqrt{8+2\tan u}}du$$

Answer: _____

23. Determine whether the improper integral is convergent or divergent. If the improper integral is convergent, evaluate.

$$\int_1^\infty \frac{6}{(6x+1)^4}dx$$

Answer: _____