

Name:

Math 2

Practice Exam 1

1. Estimate the area under the graph of $f(x) = x^3$ from $x = 0$ to $x = 5$ using 5 approximating rectangles and (a) Left Endpoints; (b) Right Endpoints.

2. Find the exact area under the graph of $f(x) = x^3$ from $x = 0$ to $x = 5$ using the limit definition of the definite integral.

3. Find the exact area under the graph of $f(x) = x^3$ from $x = 0$ to $x = 5$ using the Fundamental Theorem of Calculus.

4. Use the limit definition of the definite integral to evaluate $\int_0^5 (3x^2 + 5)dx$.

5. Evaluate the definite integral $\int_1^7 (3f(x) - 4g(x))dx$ using the fact that $\int_1^7 f(x)dx = 11$ and $\int_1^7 g(x)dx = 13$.

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6. Find the derivative of the function $g(x) = \int_3^x \sqrt{t^2 + 4} dt$.

7. Find the derivative of the function $g(x) = \int_3^{x^2} \sqrt{t^2 + 4} dt$.

8. Find the derivative of the function $g(x) = \int_{\arctan(x)}^1 \sqrt{t^2 + 4} dt$.

9. Evaluate the definite integral $\int_{-\pi}^{\frac{\pi}{2}} \cos(x) dx$.

10. Let $F(x) = x \ln(x) - x$. Evaluate the definite integral $\int_1^3 F'(x) dx$.

11. Find the indefinite integral $\int \frac{4}{x^6} dx$.

12. Find the indefinite integral $\int x(x^2 + 2)^2 dx$.

13. Let $F(x) = \int 2\sqrt{x}dx$. Find the formula for $F(x)$, given that $F(9) = 2$.

14. Evaluate the integral $\int \frac{e^x}{1 + e^x} dx$.

15. Evaluate the integral $\int \frac{x}{x^2 + 1} dx$.