



Unit 7A Assignment

Work slowly and carefully. If you are having difficulty, go back and review the appropriate *Lesson*.

As your final exam does not allow calculators, it is best to attempt all questions in this *Assignment* without a calculator.

Be sure to proofread your assignment carefully.

For full marks, show all calculations, steps, and/or explain your answers.

Total: 78 marks.

1. Find the general antiderivative of each of the following.

①

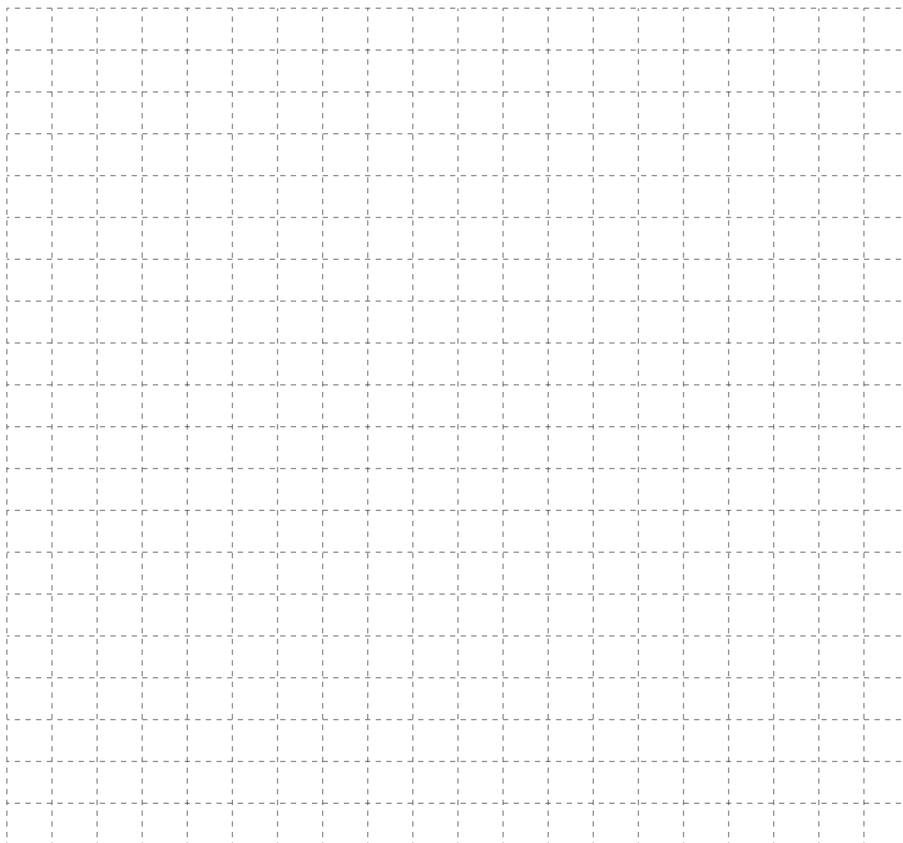
a. $\int \sqrt[3]{x^4} \, dx$

①

b. $\int x^{-3} \, dx$

2 c. $\int \frac{x^2 + 5x^3 - 7}{x^2} dx$

- 4 2. Using three different values for the constant C , draw the graph of the general antiderivative of $f(x) = -4x + 2$.



3. Determine the x -intercepts of the curve that passes through the point $(2, -12)$ and has a slope defined by $y = 2x - 3$.

4. Integrate each of the following.

a. $\int (3x^3 + 4x^2 - 2x^{-1} + 13) dx$

b. $\int (e \sin x + \sqrt{2} \cos x) dx$

5. Use the comparison technique to evaluate each of the following.

3

a. $\int x(3x^2 - 7)^{-2} dx$

3

b. $\int (1 - x)^{\frac{1}{2}} dx$

6. Use the method of integration by substitution to find each of the following.

3

a. $\int x^2(x^3 + 5)^7 dx$

3

b. $\int \tan x \sec^2 x dx$

7. Evaluate each of the following.

2

a. $\int_0^1 (x^2 + e^{3x}) dx$

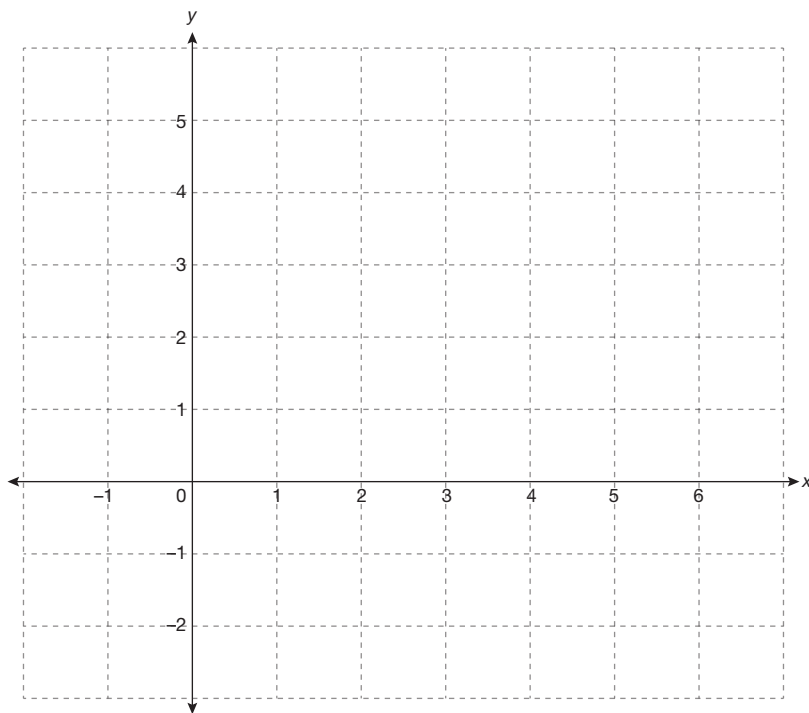
4

b. $\int_0^\pi \cos^8 x \sin x dx$

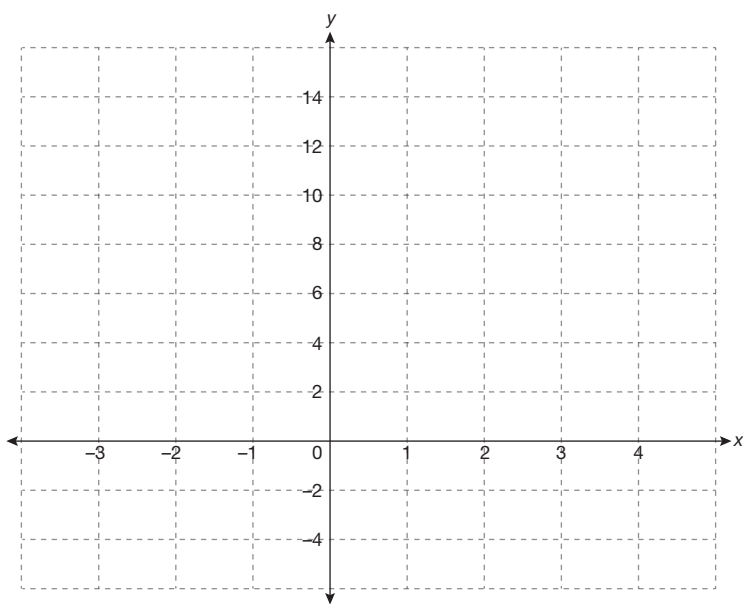
4 c. $\int_0^1 x\sqrt{1-x^2} \, dx$

- 6 8. Calculate the area bounded by the curve $f(x) = 3x^3 + 2x^2 + x$ and the x -axis, between $x = 0$ and $x = 1$ by finding the limit of the sum of the areas of inscribed rectangles as the number of rectangles increases without bound.

9. Find the exact value of the area bounded by the curve $f(x) = 4x - x^2$ and the x -axis. Sketch a graph to illustrate the solution.



- 5 10. Find the total area enclosed by the curve $f(x) = x^3 - 4x$ and the x -axis, between the lines $x = -2$ and $x = 3$. Sketch a graph to illustrate the solution.



- ③ 11. Find the area enclosed by the curves $y = e^x$ and $y = x^2 - 1$, between $x = 1$ and $x = -1$.

12. Use integration by parts to find each of the following.

3

a. $\int x \cos 5x \, dx$

3 b. $\int \frac{x}{\sqrt{x-1}} dx$

13. Use integration by partial fractions to find the following.

4

a. $\int \frac{x^2 - 1}{x^2 + 3x} dx$

4 b. $\int \frac{6}{x^3 + 3x} dx$

14. Integrate each of the following.

2

a. $\int \left(\frac{3}{x} - \frac{5x^2}{3} + x^{-\frac{2}{5}} \right) dx$

3

b. $\int \frac{dx}{(6-5x)^2}$

3

c. $\int (2 + 5x)e^{\frac{1}{3}x} dx$

4

d. $\int \frac{2x - 1}{(x - 2)^2} dx$