

In problems #1–3, find an antiderivative of the function

1. $f(x) = 1 - 3x^2 - 6x$
2. $f(x) = x - x^{\frac{2}{3}}$
3. $f(x) = \sqrt[5]{2x + 1}$

In #4–7, find the indefinite integral

4. $\int (2 + \sqrt{5}) dx$
5. $\int 2(x - 3)^3 dx$
6. $\int (x^2 \cdot \sqrt[3]{x}) dx$
7. $\int x + \frac{1}{x^4 \sqrt{x}} dx$
8. Solve the differential equation $f'(x) = 4x^3 - 3x^2 + x - 3$.
9. Find the antiderivative $F(x)$ of the function $f(x) = 2e^{2x} + x - 2$ that satisfies $F(0) = 5$.
10. Evaluate the indefinite integral $\int |x| dx$. (Hint: Examine the graph of $f(x) = |x|$.)

Answers

Review Answers

1. $F(x) = x - x^3 - 3x^2 + C$
2. $F(x) = \frac{x^2}{2} - \frac{3}{5}x^{\frac{5}{3}} + C$
3. $F(x) = \frac{5}{12}(2x + 1)^{\frac{6}{5}} + C$
4. $\int (2 + \sqrt{5}) dx = 2x + \sqrt{5}x + C$
5. $\int 2(x - 3)^3 dx = \frac{(x-3)^4}{2} + C$
6. $\int (x^2 \cdot \sqrt[3]{x}) dx = \frac{3}{10}x^{\frac{10}{3}} + C$
7. $\int x + \frac{1}{x^4\sqrt{x}} dx = \frac{x^2}{2} - \frac{4}{\sqrt[4]{x}} + C$
8. $f(x) = x^4 - x^3 + \frac{x^2}{2} - 3x + C$
9. $F(x) = e^{2x} + \frac{x^2}{x} - 2x + 4$
10. $\int |x| dx = \frac{x^2}{2} + C$

Indefinite Integrals Practice

1. Verify the statement by showing that the derivative of the right side is equal to the integrand of the left side.

a. $\int \left(-\frac{9}{x^4} \right) dx = \frac{3}{x^3} + C$

b. $\int \left(1 - \frac{1}{\sqrt[3]{x^2}} \right) dx = x - 3\sqrt[3]{x} + C$

2. Integrate.

a. $\int 6dx$

b. $\int 3t^2 dt$

c. $\int 5x^{-3} dx$

d. $\int du$

e. $\int x^{3/2} dx$

f. $\int \sqrt[3]{x} dx$

g. $\int \frac{1}{x\sqrt{x}} dx$

h. $\int \frac{1}{2x^3} dx$

i. $\int (x^3 + 2) dx$

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

k. $\int \sqrt[3]{x^2} dx$

l. $\int \frac{1}{x^3} dx$

m. $\int \frac{1}{4x^2} dx$

n. $\int \frac{t^2 + 2}{t^2} dt$

o. $\int u(3u^2 + 1) du$

p. $\int (x-1)(6x-5) dx$

q. $\int y^2 \sqrt{y} dy$

Answers

Answers: (Of course, you could have checked all of yours using differentiation!)

2. a. $6x + C$ b. $t^3 + C$ c. $-\frac{5}{2x^2} + C$ d. $u + C$

e. $\frac{2}{5}x^{5/2} + C$ f. $\frac{3}{4}\sqrt[3]{x^4} + C$ g. $\frac{-2}{\sqrt{x}} + C$ h. $-\frac{1}{4x^2} + C$

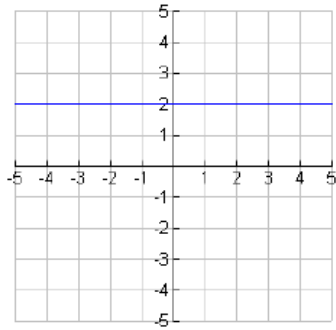
i. $\frac{x^4}{4} + 2x + C$ j. $\frac{6}{7}x^{7/3} + \frac{3}{2}x^2 - x + C$ k. $\frac{3}{5}x^{5/3} + C$ l. $-\frac{1}{2x^2} + C$ m. $-\frac{1}{4x} + C$

n. $t - \frac{2}{t} + C$ o. $\frac{3}{4}u^4 + \frac{1}{2}u^2 + C$

p. $2x^3 - \frac{11}{2}x^2 + 5x + C$ q. $\frac{2}{7}y^{7/2} + C$

3. Find two functions that have the given derivative and sketch the graph of each.

a.



b.

