

Integration Review

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

In problems #4-7, solve the differential equation for $f(x)$ given the initial condition.

r. $f'(x) = 6x^5 - 4x^2 + \frac{7}{3}$ and $f(1) = 4$.

s. $f'(x) = 3x^2 + e^{2x}$ and $f(0) = 3$.

t. $f'(x) = \sqrt[3]{x^2} - \frac{1}{x^2}$ and $f(1) = 3$

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

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. $\frac{2}{7}y^{7/2} + C$

Review Answers

r. $f(x) = x^6 - \frac{4}{3}x^3 + \frac{7}{3}x + 2$

s. $f(x) = x^3 + \frac{e^{2x}}{2} + \frac{5}{2}$

t. $f(x) = \frac{3}{5}\sqrt[3]{x^5} + \frac{1}{x} + \frac{7}{5}$