

1. Find antiderivative

(a) $\int (2t^2 - 1)^2 dt$

(b) $\int \frac{x-4}{x\sqrt{x}} dx$

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

(d) $\int \frac{4x^2+3x+1}{x^2} dx$

(e) $\int \sec \theta (\tan \theta + \cos \theta) d\theta$

(f) $\int (3s+1)^8 ds$

(g) $\int \frac{1}{(2x-5)^4} dx$

(h) $\int \frac{8}{4x+1} dx$

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

(j) $\int (14 \sin 2x - 9 \cos 3x) dx$

(k) $\int \frac{6}{\cos^2 2x} dx$

2. Find the original function using given information about its derivatives and values.

(a) $f'(x) = \frac{x^2-1}{x^5}$, $f(2) = 3$

(b) $\frac{dy}{dx} = \frac{3}{\sqrt{2x+1}}$, $y(4) = -7$

(c) $y'' = \frac{1}{2x^2}$, $y(1) = 2$, $y'(1) = 3$

(d) $f''(x) = 3e^x + 5 \sin x$, $f(0) = 1$, $f'(0) = 2$

3. A ball is thrown upward with a speed 320 ft/c from the ground. Find the time when the ball reaches its maximum height and the maximum height.

Hint: the acceleration due to gravity is 32 ft/c².

4. A car travels with speed 88 ft/c when the brakes are applied. From this moment its acceleration is -40 ft/c². Find the distance the car travels before it comes to rest?

5. Rewrite using sigma-notation.

(a) $\frac{1}{3} + \frac{1}{5} + \frac{1}{9} + \frac{1}{17} + \frac{1}{33} + \frac{1}{65}$

(b) $1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \frac{1}{5}$

6. Evaluate the sum (a) $\sum_{j=1}^{12} (2j-1)^2$

(b) $\sum_{i=1}^{10} i(3i^2+5)$

7. Find the area that lies under the graph of $f(x)$ above the given segment $[a, b]$ by setting an appropriate Riemann sum and evaluating its limit.

(a) $f(x) = (1+x)^2$ on $[0, 2]$. (b) $f(x) = 3x - 4$ on $[2, 5]$.

(c) $f(x) = 4 - x^2$ on $[-1, 1]$.