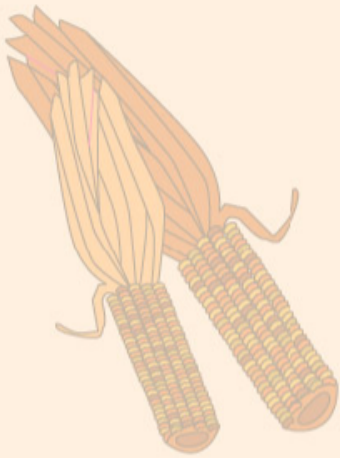


4.5 Integration by Substitution



In Exercises 7–34, find the indefinite integral and check the result by differentiation.

$$8. \int (x^2 - 9)^3 (2x) dx$$

10. $\int \sqrt[3]{(1-2x^2)(-4x)} dx$

14. $\int x(4x^2 + 3)^3 dx$

24. $\int \frac{x^3}{\sqrt{1+x^4}} dx$

In Exercises 35–38, solve the differential equation.

35. $\frac{dy}{dx} = 4x + \frac{4x}{\sqrt{16 - x^2}}$

In Exercises 41–54, find the indefinite integral.

50. $\int \sqrt{\tan x} \sec^2 x \, dx$


In Exercises 55 and 56, find an equation for the function f that has the indicated derivative and whose graph passes through the given point.

56. $f'(x) = \pi \sec \pi x \tan \pi x$ $\left(\frac{1}{3}, 1\right)$


In Exercises 57–64, find the indefinite integral by the method shown in Example 5.

58. $\int x\sqrt{2x+1} \, dx$

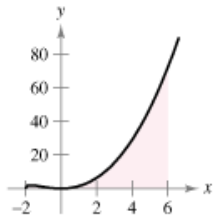
60. $\int (x + 1)\sqrt{2 - x} \, dx$

 In Exercises 65–76, evaluate the definite integral. Use a graphing utility to verify your result.

70.
$$\int_0^2 \frac{x}{\sqrt{1+2x^2}} dx$$

 In Exercises 77–82, find the area of the region. Use a graphing utility to verify your result.

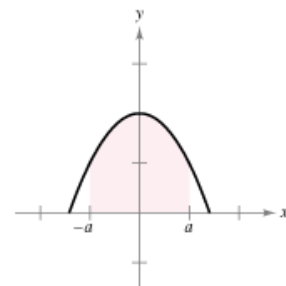
78. $\int_{-2}^6 x^2 \sqrt[3]{x+2} \, dx$



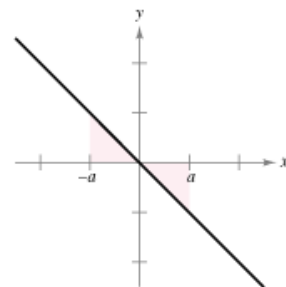
THEOREM 4.15 Integration of Even and Odd Functions

Let f be integrable on the closed interval $[-a, a]$.

1. If f is an *even* function, then $\int_{-a}^a f(x) dx = 2 \int_0^a f(x) dx$.
2. If f is an *odd* function, then $\int_{-a}^a f(x) dx = 0$.



Even function



In Exercises 91–94, evaluate the integral using the properties of even and odd functions as an aid.

$$92. \int_{-\pi/2}^{\pi/2} \sin^2 x \cos x \, dx$$

