The Indefinite Integral (Applications) (Sec 13.1)

57. Marginal Cost The marginal cost of producing the xth box of light bulbs is

$$5 - \frac{x}{10,000}$$
.

a. What is the general form of the cost function?

 ${f b.}$ Find the increase in cost if production is increased from $\ 100\ {f to}\ 200\ {f light}$ bulbs.

c. If the fixed cost is 20,000 , find the cost function C(x) .

61. Facebook Active Users At the start of 2011, Facebook had 372 million active users.

After that time, the number of active users changed at a rate of roughly

u(t)=2.12t+141 million active users per year $(0\leq t\leq 10),$

where t is time in years since the start of 2011.

a. Find an expression for the number of active users $\,U(t)\,$ at time $\,t\,$.

b. Use the answer to part (a) to estimate the number of active Facebook users midway through 2014. (Round your answer to the nearest 1 million members. The actual figure was 864 million .) **63. COVID-19 Epidemic: First Wave in the U.S.** The rate of new cases of COVID-19 in the U.S. early in the first wave of the epidemic in 2020 can be modeled by

$$n(t) = 32 \big(1.28^t \big)$$
 new cases per day $\qquad (0 \le \mathrm{t} \le 40),$

where t is time in days since February 4, 2020. $\ \ \ \ \$ Use an indefinite integral to approximate the total number of cases from February 4 up to day t. What was this number by February 29, 2020? (Round to the nearest thousand.)

- 67. Arr Health-Care Spending Write H(t) for the amount spent in the United States on health care in year t, where t is measured in years since 2019. The rate of increase of H(t) was approximately \$200 billion per year in 2019 and was projected to rise to \$320 billion per year in 2027.
 - **a.** Find a linear model for the rate of change H'(t).

b. Given that an anticipated \$3,800 billion was spent on health care in the United States in 2019, find the function H(t), and use it to estimate health-care spending in 2027.