1. Find each of the following antiderivatives.

(a) \( \int \frac{\cos(\theta)}{4} \, d\theta \)

(b) \( \int (4 - 9x + x^2) \, dx \)

(c) \( \int (12e^x + \sin(x)) \, dx \)

(d) \( \int (6y - y^3)^2 \, dy \)

(e) \( \int (86t^7 - 3\sqrt{t}) \, dt \)

(f) \( \int \frac{3t^3 - 6\sqrt{t} - \frac{9}{t}}{t} \, dt \)

(g) \( \int \left( 1 - \frac{1}{u} \right) \left( 2 + \frac{3}{\sqrt{u}} \right) \, du \)

2. The marginal revenue of a certain commodity is

\[ MR(x) = -9x^2 + 24x + 48 \]

Find the price that maximizes total revenue. (Assume that \( R(0) = 0 \).)

3. A particle moves along the \( x \)-axis in such a way that its acceleration at time \( t > 0 \) is

\[ a(t) = 1 - \frac{1}{t^2} \]

The particle’s velocity at time \( t = 2 \) is \( v(2) = 5.5 \). What is the net distance the particle travels between the times \( t = 3 \) and \( t = 6 \)?