1. Differentiate the following functions.

(a)
$$f(x) = \ln(x^2 + 3)$$

(b)
$$g(w) = w\cos(e^w)$$

(c)
$$h(s) = \frac{s^{-3} - \pi}{\sqrt{s}}$$

2. Find an antiderivative for each of the following functions.

(a)
$$p(x) = 3x^5 + 7x^4 - \frac{x^2}{3} + 11$$

(b)
$$v(t) = 2e^t - 3\cos(3t)$$

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- 1. Suppose that $f(x) = x^2 3e^x + 4$. Let F(x) be an antiderivative of f(x).
 - (a) Is the graph of f(x) increasing or decreasing at x = -2?
 - (b) Is the graph of f(x) concave up or concave down at x = -2?
 - (c) Is the graph of F(x) increasing or decreasing at x = -2?
 - (d) Is the graph of F(x) concave up or concave down at x = -2?
- 2. Find the signed areas given by the following integrals:

(a)
$$\int_{1}^{4} \pi - x^{-3/2} dx$$

(b)
$$\int_2^3 6z^5 + \frac{5}{z^{10}} dz$$

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