1. Suppose an object is moving on a one-dimensional North-South road, with North being designated the positive direction. Assume the units on distance are feet, and the units on time are seconds. Assume the trip lasts 5 seconds (from \( t = 0 \) to \( t = 5 \)) and that the position function of the object is given by \( s(t) = 2t^3 - 9t^2 + 12t - 4 \).

(a) during what time intervals was the object moving North and during what time intervals was it moving South?

(b) during what time intervals was the object speeding up and during what time intervals was the object slowing down?

2. For each “journey” described below, sketch a possible graph of the object’s position function.

(a) The object moves slowly forward for 3 seconds and then quickly backward for 1 second.

(b) The object moves backward for five seconds, speeding up for the first three seconds, then slowing down during the last two seconds.

3. Find the family of antiderivatives for each function:

(a) \( f(x) = 4x^2 - 3x + 2 \)

(b) \( f(x) = \sqrt{x} \)

(c) \( f(x) = \frac{1}{x} \)

(d) \( f(x) = \frac{19}{x^3} \)

(e) \( f(x) = \frac{1}{x} \)

(f) \( f(x) = e^x \)

(g) \( f(x) = e^{-x} \)

(h) \( f(x) = e^{2x} \)