

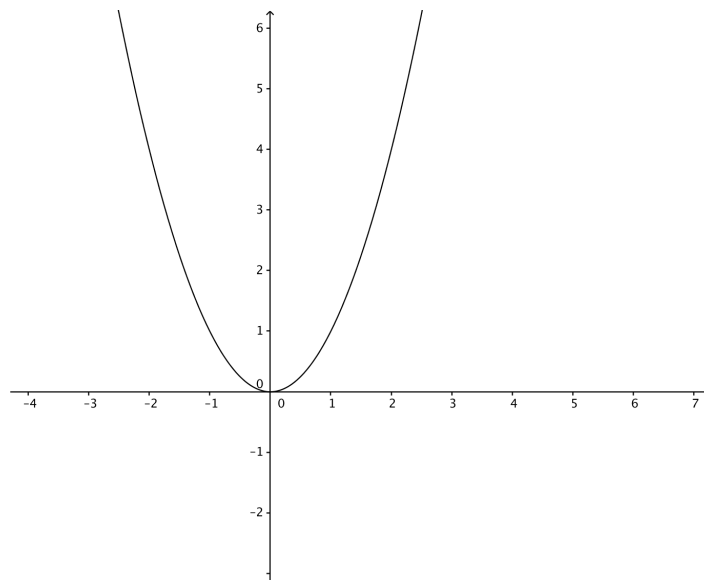
4.9 Antiderivatives

Problem 1 Find the most general antiderivative of the function

$$g(t) = e^{-2t} - 5 + 6\sqrt{t} - \frac{7}{t} + \frac{5}{11 + t^2}$$

Problem 2 Assume that $f'(t) = 4t^3 + 2t$ and $f(3) = 5$. Find $f(t)$.

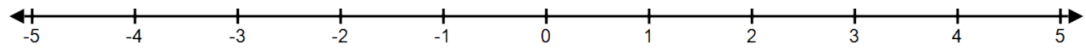
Problem 3 Given the graph of a function:



- Sketch four anti-derivatives of the given function.
- What is algebraic representation for the graph of given function f ?
- Using the function f you found in part (b) and your sketches of the antiderivative in part (a), what is the algebraic representation of one of the anti-derivatives, F_1 .
- Suppose we're given $h(x) = (1/3)x^3$, what is $h'(x)$?
- What is the relationship between f , F , h , and h' ? (Where F is the antiderivative of f .)

Problem 4 Consider an object moving along a line with velocity $v(t) = \pi \sin(\pi t)$ on $[0, 2]$ and initial position $s(0) = 0$. Time is measured in seconds and velocity in m/s.

- (a) Determine the position function, $s(t)$, on $[0, 2]$.
- (b) Mark the position of the object at the time $t = 1$ on the line below.



- (c) Determine the average velocity, v_{av} , of the object during the interval $[0, 2]$.
- (d) Determine when the motion is in the positive direction.
- (e) At what time (or times) is the object farthest from the origin?

