1. Differentiate the following functions.
(a) $f(x)=\ln \left(x^{2}+3\right)$
(b) $g(w)=w \cos \left(e^{w}\right)$
(c) $h(s)=\frac{s^{-3}-\pi}{\sqrt{s}}$
2. Find an antiderivative for each of the following functions.
(a) $p(x)=3 x^{5}+7 x^{4}-\frac{x^{2}}{3}+11$
(b) $v(t)=2 e^{t}-3 \cos (3 t)$
3. Suppose that $f(x)=x^{2}-3 e^{x}+4$. 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 $x=-2$ ?
4. Find the signed areas given by the following integrals:
(a) $\int_{1}^{4} \pi-x^{-3 / 2} d x$
(b) $\int_{2}^{3} 6 z^{5}+\frac{5}{z^{10}} d z$
