Problem Definition

Problem 31. Use the General Power Rule to find the derivative of the function.

\[ f(x) = -3\sqrt[4]{2 - 9x} \]

Solution Step 1:

Applying the power rule gives

\[
\begin{align*}
 f'(x) &= \frac{d}{dx} \left( -3\sqrt[4]{2 - 9x} \right) \\
 &= -3 \frac{d}{dx} (2 - 9x)^{\frac{1}{4}} \\
 &= -3 \cdot \frac{1}{4} (2 - 9x)^{-\frac{3}{4}} \frac{d}{dx} (2 - 9x) \\
 &= -\frac{3}{4} (2 - 9x)^{-\frac{3}{4}} (-9) \\
 &= \frac{27}{4} (2 - 9x)^{-\frac{3}{4}} \\
 &= -\frac{27}{4(2 - 9x)^{\frac{3}{4}}}
\end{align*}
\]

where the solution has been simplified to obtain the solution in the book.