Differentiate the function.

1. (1 pt)
$$f(x) = \frac{x^3 - 3x^2 + \sqrt{x}}{x}$$

Solution: Since

$$
\begin{aligned}
f(x) &= x^2 - 3x + x^{-\frac{1}{2}}, \\
f'(x) &= 2x - 3 + \left(-\frac{1}{2}\right) x^{-\frac{3}{2}}.
\end{aligned}
$$

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2. (2 pts)
$$\frac{2 - \sin x}{x + \cos x}$$

Solution:

$$\left(\frac{2 - \sin x}{x + \cos x}\right)' = \frac{-\cos x\,(x + \cos x) - (2 - \sin x)\,(1 - \sin x)}{(x + \cos x)^2}.$$

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3. (2 pts)
$$\sqrt{e^x + \tan(3x)}$$

Solution:

$$\left(\sqrt{e^x + \tan(3x)}\right)' = \frac{1}{2\sqrt{e^x + \tan(3x)}} \left(e^x + \sec^2(3x) \cdot 3\right).$$

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