SECTION 3.6 DERIVATIVES OF LOGARITHMIC FUNCTIONS

1. Fill in the derivative rules below:

$$\frac{d}{dx}\left[\arcsin(x)\right] =$$

$$\frac{d}{dx}\left[\log_b(x)\right] =$$

$$\frac{d}{dx}\left[\arccos(x)\right] =$$

$$\frac{d}{dx}\left[\ln(x)\right] =$$

$$\frac{d}{dx}\left[\arctan(x)\right] =$$

2. Find the derivative of each function below:

(a) $y = \ln(x^5)$

(b) $y = (\ln x)^5$

(c) $y = \ln(5x)$

3. Find the derivative of each function below:

(a) $f(x) = x^2 \log_2(5x^3 + x)$

(b) $g(x) = \ln(x^2 \tan^2 x)$

4. Find $\frac{dy}{dx}$ for $y = \ln \sqrt{\frac{x+\sin x}{x^2-e^x}}$.

5. Find y' for each of the following:

   (a) $y = \ln |x|$

   (b) $y = \frac{e^{-x} \sin x}{\sqrt{1-x^2}}$ (Logarithmic differentiation makes this easier.)

   (c) $y = x^{\sqrt[3]{x}}$ (Logarithmic differentiation is required.)