

Student Name: \_\_\_\_\_

Score: \_\_\_\_\_

## Derivatives of Exponential Functions

Find the derivatives of exponential functions:

$$y = 2^x$$

$$y = b^x$$

$$y = 43^{\sqrt{x}}$$

$$y = 7^{x^2}$$

$$y = 5^{\frac{3x}{2}}$$

$$y = 3^{\sin x}$$

$$y = \left(\frac{5}{2}\right)^{\cos x}$$

$$y = (13)^{\sin x}$$

$$y = \left(\frac{3}{2}\right)^x$$

$$y = \left(\frac{1}{2}\right)^{3x}$$

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**Answers:**

$$\frac{dy}{dx} = 2^x \ln 2$$

$$\frac{dy}{dx} = b^x \ln b$$

$$\frac{dy}{dx} = \frac{\ln 43 \cdot 43^{\sqrt{x}}}{2\sqrt{x}}$$

$$\frac{dy}{dx} = 2x \cdot 7^{x^2} \ln 7$$

$$\frac{dy}{dx} = \frac{3 \cdot 5^{\frac{3x}{2}} \ln 5}{2}$$

$$\frac{dy}{dx} = 3^{\sin x} \cos x \ln 3$$

$$\frac{dy}{dx} = \frac{-(\ln 5 - \ln 2) 5^{\cos x} \sin x}{2^{\cos x}}$$

$$\frac{dy}{dx} = \ln(13) \cos x (13)^{\sin x}$$

$$\frac{dy}{dx} = \frac{(\ln 3 - \ln 2) 3^x}{2^x}$$

$$\frac{dy}{dx} = \frac{-3 \ln 2}{2^{3x}}$$