Quiz 7.1: Sample Answers

1. Find $\frac{dy}{dx}$ for $y = \ln(2x^2 + 2x + 3)$.

   Since the derivative of $\ln x = \frac{1}{x}$, we have:

   $$y' = \frac{1}{2x^2 + 2x + 3}(4x + 2)$$

2. Find $\frac{dy}{dx}$ for $y = -\ln(\sin(x + 4))$.

   Applying the chain rule, we get:

   $$y' = \frac{-1}{\sin(x + 4)}\cos(x + 4)$$

3. Find $\frac{dy}{dx}$ for $y = \frac{1}{3}\cos(\ln(3x + 2))$.

   Applying the chain rule twice, we get:

   $$y' = \frac{1}{3}(-\sin(\ln(3x + 2)))\frac{1}{3x + 2}(3)$$

   Simplifying gives
   $$y' = \frac{-\sin(\ln(3x + 2))}{3x + 2}$$

4. Find $\frac{dy}{dx}$ for $y = 2\ln(\sqrt{x} + 2)$.

   Applying the chain rule, we get:

   $$y' = 2\left(\frac{1}{\sqrt{x} + 2}\right)\left(\frac{1}{2}x^{-0.5}\right)$$

   Simplifying gives
   $$y' = \frac{1}{\sqrt{x}(\sqrt{x} + 2)}$$