The Differentiation Gateway Exam

Name, please:

Compute the following derivatives. No calculators allowed. Do not simplify your answers. Be careful with your parentheses! No partial credit; 6 out of 7 must be correct to pass. You have 20 minutes.

1) \( y = \frac{1}{2}(e^x - e^{-x}) \)

2) \( y = \sqrt{\sin(3\pi x)} \)

3) \( R = \frac{\ln(p + 3)}{p^2} \)

4) \( y = (\ln x)^a \), where \( a \) is a positive constant

5) \( Y(\alpha) = (\cos \alpha)^{3/2} \)

6) \( H = s^2(1 - s^a) \), where \( a \) is a positive constant

7) \( S = \rho^{78} - 45\rho^{25} + 126\rho - e\pi \)