

Name _____

• 20 minutes

• No calculators

• Show sufficient work

We will learn l'Hospital's Rule and other shortcuts for obtaining limits later. For now you are not allowed to use these approaches.

1. (2 points) Evaluate $\sin(2 \arctan(1/2))$.

2. (2 points) Write an equation for each horizontal asymptote on the graph of the following function. Use limits to justify your answer.

$$f(x) = \frac{8 - 5e^{6x}}{9e^{2x} + 2}$$

3. (2 points each) Evaluate the following limits. For infinite limits, you must clearly show whether the limit is ∞ or $-\infty$.

(a) $\lim_{x \rightarrow 3} \frac{x^2 - 7x + 12}{x^2 - 9}$

(b) $\lim_{x \rightarrow 5^+} \frac{\ln(x) - \ln(10)}{e^x - e^5}$

(c) $\lim_{x \rightarrow 4} \frac{\sqrt{x+5} - 3}{2x - 8}$