

Practice for Exam 1

1. Solve for x : $e^{2x+1} = 5$.

2. Solve for x : $\ln(x-1) = 3$.

3. Find the range of $f(x) = x^2 - 1$, $-2 < x \leq 1$.

4. Let $f(x) = x^2 - x$ and $g(x) = x - 1$. Find $(f \circ g)(x)$ and $(g \circ f)(x)$.

5. $\lim_{x \rightarrow \infty} \frac{x^2}{2 - x^2}$

6. $\lim_{x \rightarrow 3} \frac{x^2 - 9}{x^2 - 4x + 3}$

7. $\lim_{x \rightarrow 0} \frac{\sqrt{3-x} - \sqrt{3}}{x}$

8. $\lim_{x \rightarrow 0} \frac{e^{2x} + e^{-x}}{2 + e^x}$

9. $\lim_{x \rightarrow \infty} \frac{e^x}{2 - e^x}$

10. $\lim_{x \rightarrow 0} \frac{\sin^2 x}{x}$

11. $\lim_{x \rightarrow 0} \frac{1 - \cos(2x)}{3x}$

12. Let $f(x) = \begin{cases} \frac{x^2 + x - 2}{x - 1} & \text{if } x \neq 1 \\ a & \text{if } x = 1 \end{cases}$. Which value must you assign to a so that $f(x)$ is

continuous at a ?

13. Let $f(x) = x^3 - 2x + 3$, $-3 \leq x \leq -1$. Use the Intermediate Value Theorem to show that $x^3 - 2x + 3 = 0$ has a solution in the interval $(-3, -1)$.