

DoNow

1. Consider the function, $f(x) = x + 1 + \frac{10^{-10}}{x - 1}$.
 - (a) Looking at the equation, what is the domain for f ? Explain.
 - (b) Use a *zoom decimal* window to plot this on a graphing calculator. What kind of discontinuity do you see when $x = 1$?
 - (c) Move the cursor to point $(1, 2)$. Use *zoom in* (with zoom factors of 10 and 10) to examine the discontinuity. What do you see?

From Yesterday

2. Let $f(x) = b^x$.
 - (a) Use an algebraic definition of the derivative to show that

$$f'(x) = k_b \cdot f(x)$$

where k_b is a constant that depends on the value of b .

Be sure to show all your work.

- (b) Take a careful look at k_b . How can you describe k_b using the geometry of the graph of $f(x)$? Explain.
3. Use the cheer to derive a formula for $\cos(2\theta)$ when you only know $\cos(\theta)$.
 4. This limit represents the derivative of some function g at some number a . Give equations for g and a .

$$\lim_{h \rightarrow 0} \frac{\sqrt[3]{27 + h} - 3}{h}$$

5. Recall we define logarithms by the equivalence: $\log_b a = x \iff b^x = a$.
Use the definition of a log to show $\log_b(a^2) \equiv 2\log_b(a)$.