Tutorial 3

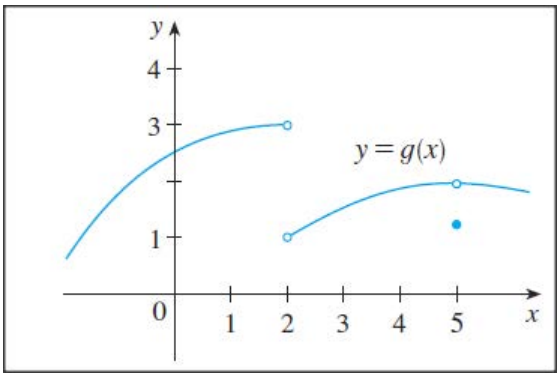
Week of September 24, 2018

1. Suppose $g(x) = 3 + x + e^x$. Find $g^{-1}(4)$ (without finding an explicit formula).
2. Find a formula for the inverse.
   (a) $y = 1 + \sqrt{2 + 3x}$
   (b) $y = e^{2x-1}$
   (c) $y = \ln(x + 3)$
   (d) $y = \dfrac{1 - e^{-x}}{1 + e^{-x}}$
3. Evaluate the following.
   (a) $\log_2(32)$
   (b) $\log_8(2)$
   (c) $\log_{10}(40) + \log_{10}(2.5)$
   (d) $\log_8(60) - \log_8(3) - \log_8(5)$
   (e) $e^{-\ln(2)}$
   (f) $e^{\ln(\ln(e^3))}$
4. Solve the following.
   (a) $2^{x-5} = 3$
   (b) $\ln(x) + \ln(x - 1) = 1$
   (c) $\ln(\ln(x)) = 1$
   (d) $e^{ax} = Ce^{bx}$
5. Explain what it means to say:

$$\lim_{x \to 1^-} f(x) = 3 \quad \text{and} \quad \lim_{x \to 1^+} f(x) = 7$$

   In this situation, can the limit of $f(x)$ as $x \to 1$ exist?

6. State the following limits.



(a) $\lim_{x \to 5^-} g(x)$

(b) $\lim_{x \to 5^+} g(x)$

(c) $\lim_{x \to 5} g(x)$

7. Determine the infinite limit.

(a) $\lim_{x \to 5^-} \dfrac{x+1}{x-5}$

(b) $\lim_{x \to 3^-} \dfrac{\sqrt{x}}{(x-3)^5}$

(c) $\lim_{x \to 2\pi^-} x \csc(x)$