

3. [8 points] **You do not need to show any work for this problem.**

- a. [2 points] Which of the following functions dominates **all** the others as $x \rightarrow \infty$? **Circle exactly one of the options below.**

$$f(x) = 0.01(1.3)^x$$

$$g(x) = 100x^{10}$$

$$h(x) = 300(0.25)^x$$

$$i(x) = 4^{-2x}$$

$$j(x) = 300 \ln(4|x|)$$

$$k(x) = 100 \left(\frac{6}{5}\right)^x$$

- b. [2 points] Which of the following functions dominates **all** the others as $x \rightarrow -\infty$? **Circle exactly one of the options below.**

$$f(x) = 0.01(1.3)^x$$

$$g(x) = 100x^{10}$$

$$h(x) = 300(0.25)^x$$

$$i(x) = 4^{-2x}$$

$$j(x) = 300 \ln(4|x|)$$

$$k(x) = 100 \left(\frac{6}{5}\right)^x$$

- c. [2 points] Let $f(x)$ be an odd function with:

$$\lim_{x \rightarrow -3^+} f(x) = -\infty \quad \text{and} \quad \lim_{x \rightarrow -3^-} f(x) = \infty$$

Suppose that $f(3) = 0$. Evaluate $\lim_{x \rightarrow 3^-} f(x)$. Write your answer *in the space provided*. If there is not enough information to evaluate the limit, write NOT ENOUGH INFORMATION.

$$\lim_{x \rightarrow 3^-} f(x) = \underline{\hspace{2cm} \infty \hspace{2cm}}$$

- d. [2 points] Consider the functions:

$$f(x) = 1 + \sqrt{1+x}$$

$$g(x) = 1 + x$$

Find the formula of a function $h(x)$ for which $f(x) = g(h(x))$. Write your answer *in the space provided*.

$$h(x) = \underline{\hspace{2cm} \sqrt{1+x} \hspace{2cm}}$$