1. [19 points] The graphs of the functions $f(x)$ and $g(x)$ are shown below.

Note that the graph of $f(x)$ is linear for $x < -2$ and $x > 2$, and $g(x)$ is linear on $-3 < x < 1$ and $1 < x < 3$.

For each of the following parts, find the given limit. If any of the quantities do not exist (including the case of limits that diverge to $\infty$ or $-\infty$), write DNE. If the limit cannot be found based on the information given, write NOT ENOUGH INFO. You do not need to show any work.

a. [2 points] Find $\lim_{x \to -1} f(x)$.

$$\lim_{x \to -1} f(x) = \ldots$$

b. [2 points] Find $\lim_{t \to 2^-} 2(f(t) - 3)$.

$$\lim_{t \to 2^-} 2(f(t) - 3) = \ldots$$

c. [2 points] Find $\lim_{x \to 1} f(x)g(x)$.

$$\lim_{x \to 1} f(x)g(x) = \ldots$$

d. [2 points] Find $\lim_{x \to \infty} f(e^{-x})$.

$$\lim_{x \to \infty} f(e^{-x}) = \ldots$$

e. [2 points] Find $\lim_{x \to 2^+} g^{-1}(x)$.

$$\lim_{x \to 2^+} g^{-1}(x) = \ldots$$

f. [2 points] Find $\lim_{h \to 0} \frac{f(3 + h) - f(3)}{h}$.

$$\lim_{h \to 0} \frac{f(3 + h) - f(3)}{h} = \ldots$$
The graphs of the functions $f(x)$ and $g(x)$ are included here for your convenience.

**g.** [3 points] Find all the values of $x$ with $-5 < x < 4$ at which the function $f(x)$ is not continuous.

**Answer:**

**h.** [2 points] What is the range of $y = g(x)$?

**Answer:**

**i.** [2 points] For which of the following values of $x$ is $f'(x) > 0$? Circle all that apply.

- $x = -5$
- $x = -1$
- $x = 1.5$
- $x = e$
- NONE OF THESE

**2.** [5 points] Let

$$K(p) = (1 + \cos(p))^{1+2p}.$$  

Use the limit definition of the derivative to write an explicit expression for $K'(4)$. Your answer should not involve the letter $K$. Do not attempt to evaluate or simplify the limit. Please write your final answer in the answer box provided below.

**Answer:** $K'(4) =$