1. [12 points] For each problem below, circle all of the statements that MUST be true. (The three parts (a)–(c) are independent of each other. No explanations are necessary.)

    a. [5 points] Suppose f is an increasing differentiable function with domain $(-\infty, \infty)$ so that $f(1) = 1$ and $f(-1) = -1$.

         ○ f is linear.

         ○ $\boxed{\text{There is a number } c \text{ so that } f(c) = 0.}$

         ○ $\boxed{\lim_{x \to 1} f(x) = 1}$

         ○ $\lim_{x \to \infty} f(x) = \infty$

         ○ $\boxed{f'(1) \geq 0}$

    b. [3 points] Suppose $g(t)$ is the mass (in grams) of mold on a wedge of cheese in a refrigerator t days after it was abandoned. This mass grows exponentially as a function of time for two weeks, when it is finally thrown away.

         ○ $\boxed{\text{The graph of } g \text{ is concave up.}}$

         ○ $\boxed{\text{The continuous growth rate of } g \text{ is less than the daily growth rate.}}$

         ○ The amount of time it takes for the mass of mold on the cheese to triple is 1.5 times the amount of time it takes for it to double.

    c. [4 points] If $f(x) = \dfrac{g(x)}{h(x)}$ and $h(3) = 0$ then

         ○ The graph of f has a vertical asymptote at $x = 3$.

         ○ $\boxed{\text{3 is not in the domain of } f.}$

         ○ f is not continuous on $[-2, 2]$.

         ○ $\lim_{x \to 3} f(x)$ does not exist.