10. [8 points] For each question below, circle the answer that correctly completes the statement. There is exactly one correct answer per problem. You do not need to show any work or give any explanation. There is no penalty for guessing. Any unclear marks will receive no credit.

a. [2 points] Suppose $f(x) = x^4 - 2a^2x^2 + 2a^2$ where $a > 2$ is a positive constant. The critical points of $f(x)$ are at $x = 0, \pm a$. Then the global maximum of $f(x)$ on $[-2a, 1]$ occurs at

$x = a$ $\quad$ $x = -a$ $\quad$ $x = \pm a$ $\quad$ $x = 0$ $\quad$ $\boxed{x = -2a}$ $\quad$ $x = 1$

b. [2 points] Suppose $f(x) = x^4 - 2a^2x^2 + 2a^2$ where $a > 2$ is a positive constant. The critical points of $f(x)$ are at $x = 0, \pm a$. Then the global minimum of $f(x)$ on $[-2a, 1]$ occurs at

$x = a$ $\quad$ $\boxed{x = -a}$ $\quad$ $x = \pm a$ $\quad$ $x = 0$ $\quad$ $x = -2a$ $\quad$ $x = 1$

c. [2 points] If $g(x)$ is a positive differentiable function, then for $x > 0$, the derivative of the function $\dfrac{\ln x}{g(x)}$ is

$\dfrac{1}{xg(x)}$ $\quad$ $\dfrac{1}{xg'(x)}$ $\quad$ $\boxed{\dfrac{1}{xg(x)} - \dfrac{g'(x)\ln x}{(g(x))^2}}$

$\dfrac{1}{xg(x)} + \dfrac{g'(x)\ln x}{(g(x))^2}$ $\quad$ $\dfrac{1}{xg'(x)} - \dfrac{\ln x}{g(x)^2}$ $\quad$ $\dfrac{1}{xg'(x)} + \dfrac{\ln x}{g(x)^2}$

d. [2 points] Suppose the local linearization of a function $h(x)$ at the point $(x, y) = (2, -1)$ gives the estimate $h(2.1) \approx -0.88$. The value of $h'(2)$ is

0.12 $\quad$ -0.12 $\quad$ 8.8 $\quad$ -8.8 $\quad$ $\boxed{1.2}$ $\quad$ -1.2