1. **True** or **False**—no explanation necessary. Circle **True** only if the statement is *always* true. You are encouraged to answer these problems only if you are sure of your answer.

   Scoring will be:
   - 2 points for each correct answer,
   - 0 points for not answering, and
   - -1 point for each incorrect answer.

   Assume that all functions are continuous and differentiable.

   (a) If $f$ is increasing, then $f'$ is increasing.  **True**  **False**

   (b) If $y = \pi^5$, then $y' = 5\pi^4$.  **True**  **False**

   (c) If $f'$ is increasing, then the graph of $f$ lies above the graph of any line that is tangent to the curve.  **True**  **False**

   (d) If $f''(a) = 0$, then $f$ has an inflection point at $x = a$.  **True**  **False**

   (e) If $f''$ is negative at a critical point, then $f$ has a local maximum at that point.  **True**  **False**

   (f) If $a \neq b$, then $\int_a^b f(x) \, dx \neq 0$.  **True**  **False**

   (g) If $f(x) \leq g(x)$ for all $x$ on the interval $[2, 6]$, then $\int_2^6 [g(x) - f(x)] \, dx \geq 0$.  **True**  **False**

   (h) If $\int_a^b (2f(x) + g(x)) \, dx = 5$ and $\int_a^b g(x) \, dx = 2$, then $\int_a^b f(x) = 3$.  **True**  **False**