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

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

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