

1. [12 points] Let $f(x)$ and $g(x)$ be **increasing** continuous functions defined on the interval $[0, 10]$ with $f(0) = g(0) = 0$. Also suppose f is always concave down and g is always concave up. For each of the following statements, determine whether it is always true, sometimes true, or never true, and circle only one option. Explanations are not necessary and they will not be counted for credit.

a) $\int_0^{10} f(x)dx > \int_0^{10} g(x)dx.$

always **sometimes** **never**

b) $f'(10) < g'(10).$

always **sometimes** **never**

c) $g'(0) > g'(2).$

always **sometimes** **never**

d) $\int_0^{10} |f(x)|dx = \int_0^{10} f(x)dx.$

always **sometimes** **never**

e) $\int_0^{10} f'(x)dx > 0.$

always **sometimes** **never**

f) If G is an antiderivative of g , then $G(10) > 0.$

always **sometimes** **never**