

6. (16 points) State whether each of the following statements are TRUE or FALSE. For each statement, give an explanation. If the statement is false, give an example that shows a contradiction to the statement. If the statement is true, show why it is true. Examples may be formulas or graphs. Explain your reasoning.

(a) If $f'(x)$ is increasing, then $f(x)$ is also increasing.

(b) If $f(x) \neq g(x)$ for all x , then $f'(x) \neq g'(x)$.

(c) There is a function which is continuous on $[1,5]$ but not differentiable at $x = 3$.

(d) If a function is increasing on an interval, then it is concave up on that interval.