

August 6, 1999

Your name _____

leave for solutions On all the following questions, **show your work.**

1. Let $f(x)$ be a function whose derivative $f'(x)$ is given by

$$f'(x) = \frac{(x+3)^2(x+1)(x-2)}{(x-1)^2}$$

Find the intervals over which f is increasing.

2. True or false.

- (a) If f is increasing on (a, b) , then $f'(x) > 0$ for each x in (a, b) .
- (b) If $f'(c) = 0$, then f has a relative maximum or a relative minimum at $x = c$.
- (c) If f has a relative maximum or a relative min. at $x = c$, then $f'(c) = 0$.
- (d) If $f'(c) = 0$ and $f''(c) < 0$, then f has a relative maximum at $x = c$.
- (e) If $f'(x) > 0$ for each x in the interval $(-1, 1)$, then f is increasing on $(-1, 1)$.
- (f) If $f(a) < 0$, $f(b) > 0$, and $f'(x) > 0$ for each x in (a, b) , then there is one and only one number c in (a, b) such that $f(c) = 0$.