Suppose you have differentiated a function $f(x)$ and found that

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

Find the intervals over which $f$ is increasing.

**Solution:** The critical numbers are $x = -3, x = 2,$ and $x = 3$. Pick test points in each of the four intervals determined by these three points. Note that $f'$ is positive in the leftmost and rightmost intervals and does not change signs at $x = -3$, so $f$ is increasing on $(-\infty, -3), (-3, 2)$ and $(3, \infty)$. 
