

You may need some extra paper to complete some of these!

1. Determine the *sign* (positive or negative) of each of the following quantities, based on the given information about x .

a. $(x - 3)$ if x is just slightly less than 3.

b. $(x - 5)^3$ if x is just slightly greater than 5.

c. $(x + 1)(x - 1)$ if x is just slightly less than 1.

d. $\frac{x - 10}{x - 19}$ if x is just slightly less than 10.

e. $\frac{-2}{(x - 30)^4}$ if x is very close (but not equal) to 30.

f. $\frac{(x + 4)(x - 7)}{x^2(x - 11)}$ if x is very close (but not equal) to 0.

2. Evaluate the following limits. Use $+\infty$ or $-\infty$ if appropriate.

a. $\lim_{x \rightarrow 8} \frac{12}{(x - 8)^2}$

b. $\lim_{x \rightarrow 1^-} \frac{x^2 + 2x - 3}{x^2 + x + 1}$

c. $\lim_{x \rightarrow 25} \frac{(13 - x)}{(x - 25)^2}$

d. $\lim_{x \rightarrow 3^+} \frac{x^2 - 3}{(x - 3)(x + 3)}$

Go on to #3 and #4 on the back...

3. For the function $f(x) = \frac{x^3 - 8}{x^2 - 4}$,

- a. Identify all points at which $f(x)$ is undefined.
- b. Identify all vertical asymptotes of the function.
Compute one-sided limits at each vertical asymptote.
- c. Identify all points at which the function has a removable discontinuity.
- d. Identify the intervals on which the function is continuous.

4. Repeat parts (a)-(d) of the above problem with the function $f(x) = \frac{5x^4 - 16x^3}{8x^4 - x^3}$