

For each of the following functions and values $x = a$:

(a) If you were to directly plug in $x = a$ to this function, what would the value look like? Your answer should be one of

$$\frac{0}{0} \quad 0^0 \quad 1^\infty$$

These are all examples of *indeterminate forms*.

(b) Draw a graph of the function near $x = a$. Using this or a table of values, compute

$$\lim_{x \rightarrow a^-} \quad \lim_{x \rightarrow a^+} \quad \lim_{x \rightarrow a}$$

for this function.

1. $f(x) = \frac{x^2 - 4}{x - 2} \quad x = 2$

2. $g(x) = \frac{x^2 - 9}{x^2 - 6x + 9} \quad x = 3$

3. $h(x) = \frac{x^2 + 2x + 1}{x + 1} \quad x = -1$

4. $l(x) = \frac{\sin x}{x} \quad x = 0$

5. $m(x) = x^{\sin x} \quad x = 0$

6. $n(x) = x^{(1/\ln(2x))} \quad x = 0$

7. $q(x) = (1 + \ln(x))^{1/(x-1)} \quad x = 1$

8. $r(x) = (\cos x)^{3/x^2} \quad x = 0$

9. $s(x) = (1 + x)^{\frac{1}{x}} \quad x = 0$

(c) What can you say about limits of the form $\frac{0}{0}$, 0^0 or 1^∞ ?