

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  $1^\infty$ ?