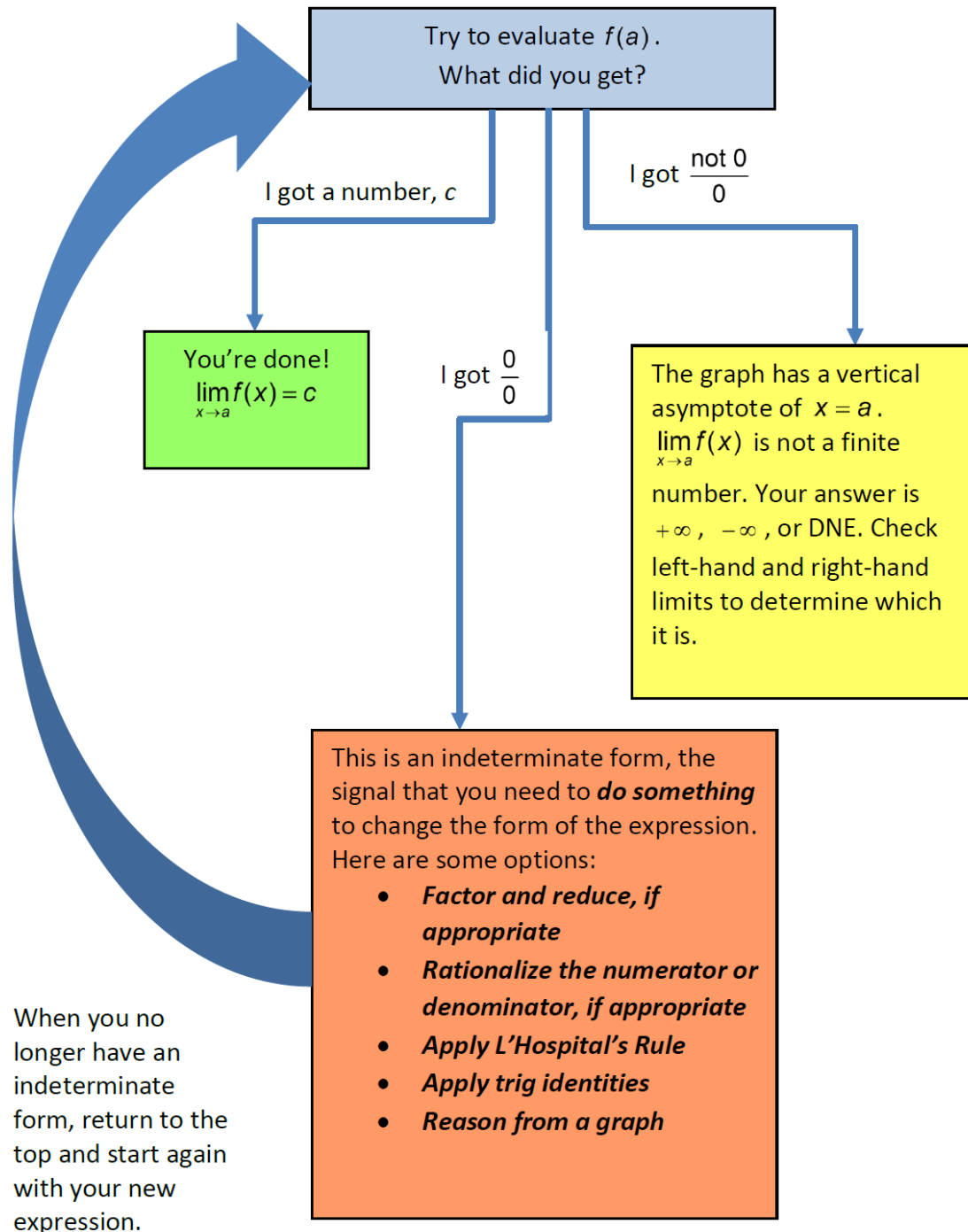


## Limit Strategy Flowchart

The following flowchart can help you pick a strategy for evaluating limits of the form  $\lim_{x \rightarrow a} f(x)$ , where  $f(x)$  is a rational expression.

Study the flowchart, making sure you understand it. In your textbook, turn to exercises asking you to evaluate a variety of limit expressions, and practice applying the flowchart.



**Evaluate each limit**

1) $\lim_{x \rightarrow 1} (12x^3 + x^2 - 1)$	2) $\lim_{x \rightarrow 5} \frac{x+1}{x+2}$	3) $\lim_{x \rightarrow 4} \frac{x^2 + 5x + 4}{x+2}$
4) $\lim_{x \rightarrow 0} \frac{x^2 - 2x}{x}$	5) $\lim_{x \rightarrow 4} \frac{4-x}{2-\sqrt{x}}$	6) $\lim_{x \rightarrow \frac{\pi}{4}} (\sin^2 x + \cos^2 x)$
7) $\lim_{x \rightarrow -1} \frac{2x^2 - x - 3}{x+1}$	8) $\lim_{x \rightarrow 3} \frac{\sqrt{x+13} - 4}{x-3}$	9) $\lim_{x \rightarrow -3} \frac{2x+1}{x+3}$
10) $\lim_{x \rightarrow 1} f(x)$ for $f(x) = \begin{cases} 2x+1, & x < 1 \\ x-3, & x \geq 1 \end{cases}$	11) Suppose $\lim_{x \rightarrow 3} f(x) = -5$ and $\lim_{x \rightarrow 3} g(x) = 2$ , evaluate $\lim_{x \rightarrow 3} 4[f(x) - 2g(x)]$	
12) Suppose $f(x) = \begin{cases} x^2 - ax, & x \leq 2 \\ 3x + 6, & x > 2 \end{cases}$ , find the value $a$ that guarantees that $\lim_{x \rightarrow 2} f(x)$ exists.		

**Answers**

1) 12	2) $\frac{6}{7}$	3) $\frac{20}{3}$
4) -2	5) 4	6) 1
7) -5	8) $\frac{1}{8}$	9) DNE
10) DNE	11) -36	