

# LIMIT BOOTCAMP

## Round 1: Warm-up

1.  $\lim_{x \rightarrow 2} \frac{x-2}{x^2-4}$

3.  $\lim_{x \rightarrow 1} \frac{x^6-1}{x^4-1}$

5.  $\lim_{x \rightarrow 0} \frac{\sin x}{e^x}$

7.  $\lim_{x \rightarrow \infty} \frac{\ln x}{x}$

9.  $\lim_{x \rightarrow 0} \frac{e^{4x}-1}{\cos x}$

2.  $\lim_{x \rightarrow 1} \frac{x^2+3x-4}{x-1}$

4.  $\lim_{x \rightarrow 0} \frac{e^x-1}{\sin x}$

6.  $\lim_{x \rightarrow 1} \frac{\ln x}{x-1}$

8.  $\lim_{x \rightarrow \infty} \frac{(\ln x)^3}{x^2}$

10.  $\lim_{x \rightarrow 1} \frac{x^b-1}{x^b-1}, b \neq 0$

11.  $\lim_{x \rightarrow a} \frac{\sqrt[3]{x}-\sqrt[3]{a}}{x-a}, a \neq 0$

In Exercises 12–15, which function dominates as  $x \rightarrow \infty$ ?

12.  $x^5$  and  $0.1x^7$

13.  $0.01x^3$  and  $50x^2$

14.  $\ln(x+3)$  and  $x^{0.2}$

15.  $x^{10}$  and  $e^{0.1x}$

## Round 2: Work-out

25.  $\lim_{x \rightarrow \infty} \frac{x}{e^x}$

27.  $\lim_{t \rightarrow \infty} \left( \frac{1}{t} - \frac{2}{t^2} \right)$

29.  $\lim_{x \rightarrow 0} (1+x)^x$

26.  $\lim_{x \rightarrow 1} \frac{x}{x-1}$

28.  $\lim_{t \rightarrow 0^+} \frac{1}{t} - \frac{1}{e^t-1}$

30.  $\lim_{x \rightarrow \infty} (1+x)^{1/x}$

## Round 3: The Game



60.  $\lim_{x \rightarrow 0} \frac{e^x - 1 - \ln(1+x)}{x^2}$

61.  $\lim_{x \rightarrow \pi/2} \frac{1 - \sin x + \cos x}{\sin x + \cos x - 1}$

62.  $\lim_{x \rightarrow 1} \frac{x^x - x}{1 - x + \ln x}$