

Practice with L'Hôpital

Jean Yang

$$1) \lim_{x \rightarrow 0} \frac{\cot x}{\ln x}$$

$$3) \lim_{x \rightarrow 0} \frac{\sin^{-1} 2x}{x}$$

$$5) \lim_{x \rightarrow +\infty} x \sin \frac{\pi}{x}$$

$$7) \lim_{x \rightarrow +\infty} (1 - \frac{3}{x})^x$$

$$9) \lim_{x \rightarrow 1} (2-x)^{\tan[(\frac{\pi}{2})x]}$$

$$11) \lim_{x \rightarrow 0} (\csc x - \frac{1}{x})$$

$$13) \lim_{x \rightarrow +\infty} [x - \ln(x^2 + 1)]$$

$$15) \lim_{x \rightarrow 0} (\frac{1}{x} - \frac{1}{e^x - 1})$$

$$2) \lim_{x \rightarrow +\infty} \frac{x^{100}}{e^x}$$

$$4) \lim_{x \rightarrow +\infty} x \cdot e^{-x}$$

$$6) \lim_{x \rightarrow \frac{\pi}{2}^-} \sec 3x \cos 5x$$

$$8) \lim_{x \rightarrow 0} (e^x + x)^{\frac{1}{x}}$$

$$10) \lim_{x \rightarrow +\infty} [\cos(\frac{\pi}{x})]^{x^2}$$

$$12) \lim_{x \rightarrow +\infty} (\sqrt{x^2 + x} - x)$$

$$14) \lim_{x \rightarrow 0} (\frac{1}{x^2} - \frac{\cos 3x}{x^2})$$

$$16) \lim_{x \rightarrow +\infty} [\ln x - \ln(1+x)]$$



Antoine Marquis de l'Hôpital

Indeterminate Forms

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

Remember, the following types of limits are not indeterminate forms:

$$\frac{0}{\infty} \quad \frac{\infty}{0} \quad 0^\infty \quad \infty \cdot \infty \quad +\infty + (+\infty) \quad +\infty - (-\infty) \\ -\infty + (-\infty) \quad -\infty - (+\infty)$$