



*Limits of Trigonometric
Functions and Transcendentals*

Trigonometric Functions and Transcendentals

- Find the shapes of transcendental functions and use them to find limits.
- Language Objectives:
 - Describe the transcendental functions and their shapes.

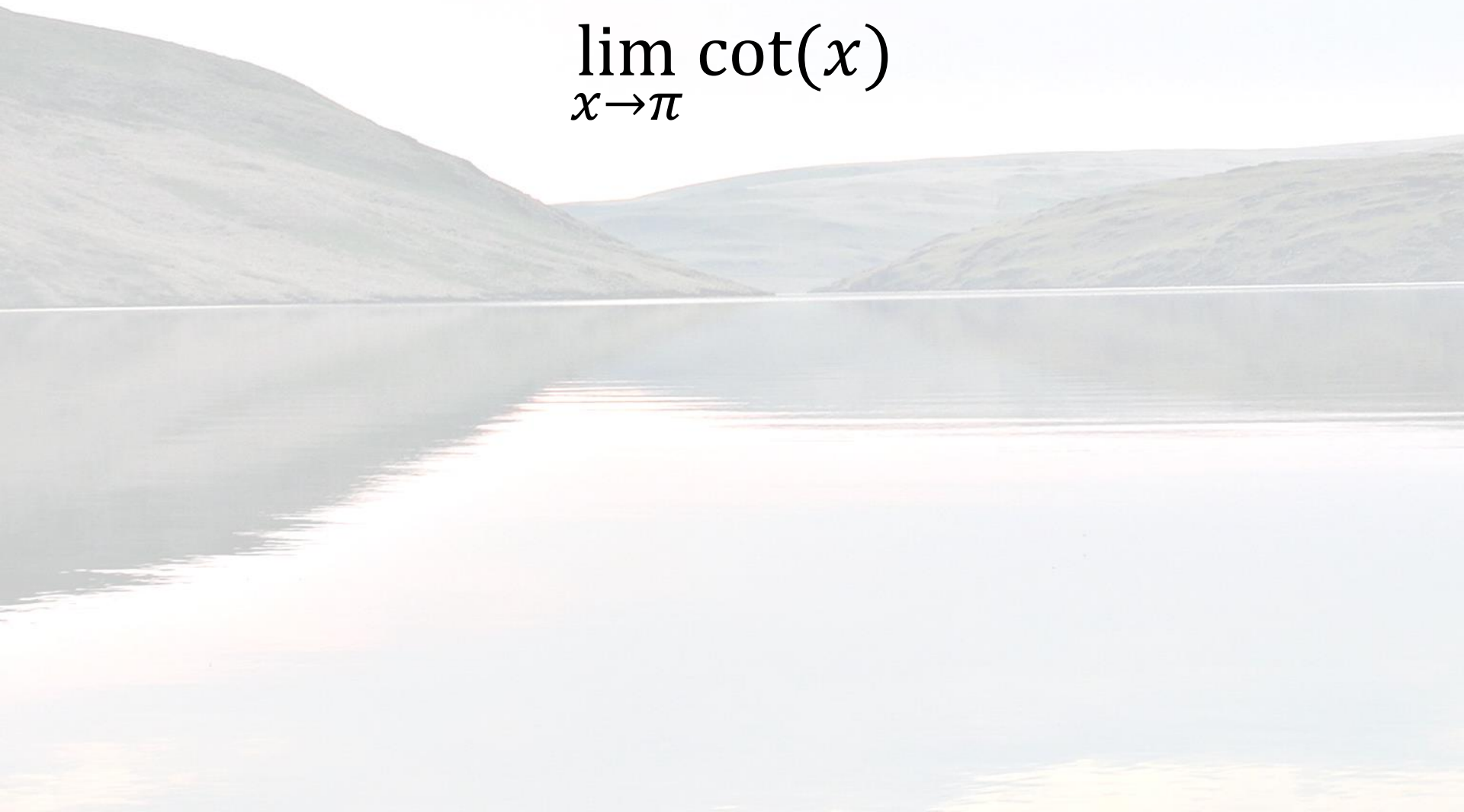
Looking at sine

$$\lim_{x \rightarrow 0} \sin(x)$$

$$\lim_{x \rightarrow \infty} \sin(x)$$

Looking at others

$$\lim_{x \rightarrow \pi} \cot(x)$$



Transcendental Functions

Transcendentals

- Numbers

- $\sum_{k=1}^{\infty} 10^{-k} =$
0.1100010000000000000000000000100

- e

- π

- Functions

- x^{π}

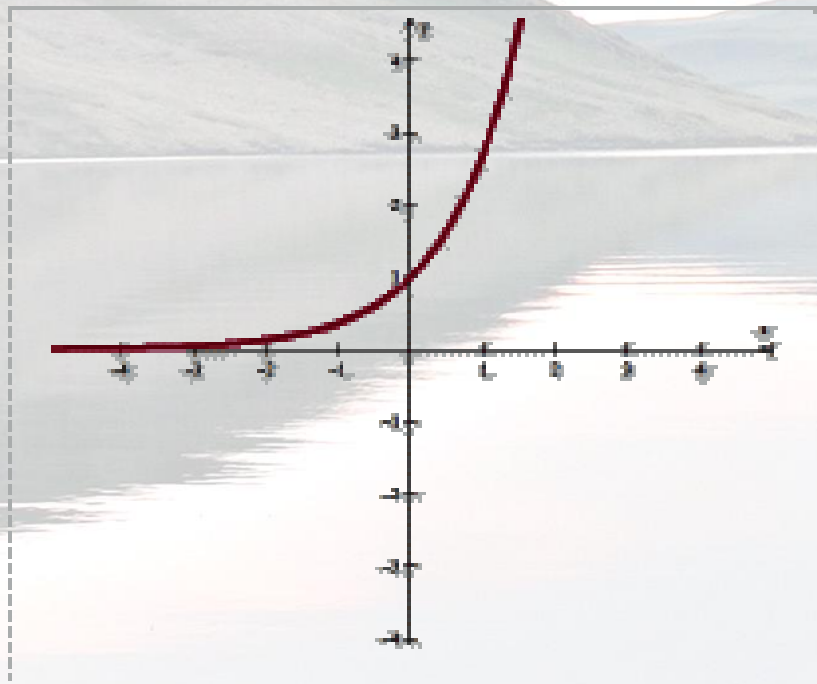
- c^x

- $\ln(x)$

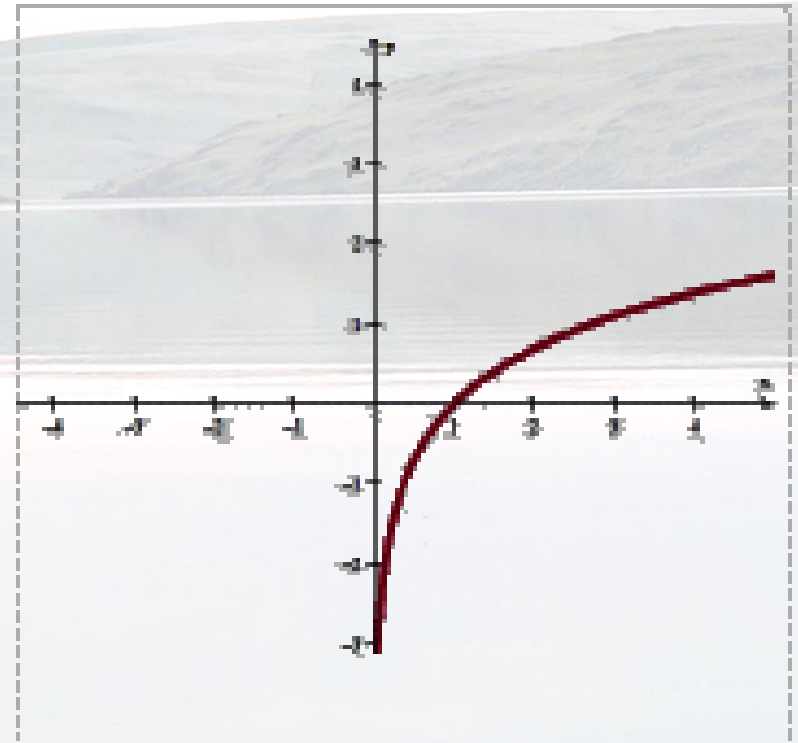
- $\sin(x)$

Graphical Behavior

e



ln



Making a Conclusion

$$\lim_{x \rightarrow \infty} \frac{3x + 2}{e^x}$$

Making a Conclusion

$$\lim_{x \rightarrow -\infty} \frac{e^x}{\ln |x|}$$

Making a Conclusion

$$\lim_{x \rightarrow \infty} \frac{\cos(x)}{x}$$

Practice

1. Evaluate $\lim_{x \rightarrow 0} \frac{\cos x}{x}$.

2. Evaluate $\lim_{x \rightarrow -\infty} \frac{\sin x}{x}$.

3. Evaluate $\lim_{x \rightarrow \infty} \frac{e^x}{x^2 + 2x - 5}$.

4. Evaluate $\lim_{x \rightarrow -\infty} \frac{e^x}{x^2 + 2x - 5}$.

5. Evaluate $\lim_{x \rightarrow -\infty} \cos x$.

6. Evaluate $\lim_{x \rightarrow 0} x^2 \sin\left(\frac{1}{x}\right)$.