

# Limits — Basic limit problems

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Summary: This document contains the basic limit problems and their solutions.

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## Basic limit problems

1.  $\lim_{x \rightarrow 3} x = ?$

**Solution:**

$$\lim_{x \rightarrow 3} x = 3.$$

2.  $\lim_{x \rightarrow a} (x^2 + 7) = ?$

**Solution:**

$$\lim_{x \rightarrow a} (x^2 + 7) = a^2 + 7.$$

3.  $\lim_{x \rightarrow \pi} \cos\left(\frac{x}{2}\right) = ?$

**Solution:**

$$\begin{aligned} \lim_{x \rightarrow \pi} \cos\left(\frac{x}{2}\right) &= \cos\left(\frac{\pi}{2}\right) \\ &= 1. \end{aligned}$$

4.  $\lim_{x \rightarrow \infty} e^{-x} = ?$

**Solution:**

$$\begin{aligned} \lim_{x \rightarrow \infty} e^{-x} &= e^{-\infty} \\ &= 1. \end{aligned}$$

5.  $\lim_{x \rightarrow a} \frac{x - 3}{x^2 + 7} = ?$

**Solution:**

$$\lim_{x \rightarrow a} \frac{x - 3}{x^2 + 7} = \frac{a - 3}{a^2 + 7}.$$

6.  $\lim_{x \rightarrow \pi} x \cos x = ?$

**Solution:**

$$\begin{aligned} \lim_{x \rightarrow \pi} x \cos x &= \pi \cos \pi \\ &= -\pi. \end{aligned}$$