

Exercises 4.1, Mathematics 1 (12-PHY-BIPMA1)
Artem Sapozhnikov

Compute the limits:

1.

$$\lim_{x \rightarrow 0} \frac{a^x - b^x}{x},$$

where $a > 0$ and $b > 0$,

2.

$$\lim_{x \rightarrow \infty} \frac{\ln(1 + e^{\alpha x})}{\ln(1 + e^{\beta x})},$$

where $\alpha > 0$ and $\beta > 0$,

3.

$$\lim_{x \rightarrow \infty} \left(\frac{x+2}{x-2} \right)^x,$$

4.

$$\lim_{x \rightarrow 0} (\cos x)^{\frac{1}{1-\cos x}},$$

5.

$$\lim_{x \rightarrow 0} (1 + 2 \tan^2 x)^{\cot^2 x}.$$