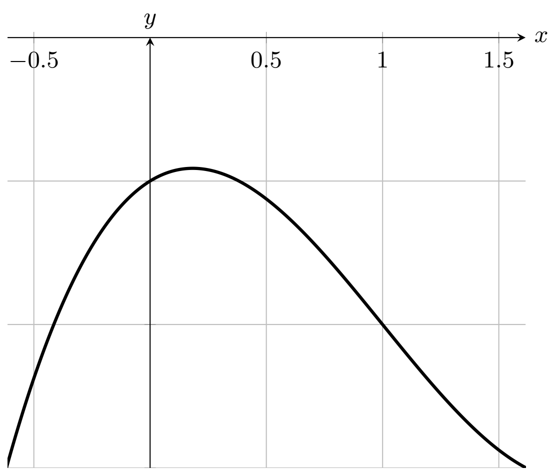
Exercise 1 *Find*

$$\lim_{x\to 0} x^3 - 3x^2 + x - 5 = \boxed{-5}$$

Hint: *This function is continuous everywhere. Therefore, left-hand and right-hand limits exist at every point and are equal. Use this to your advantage by applying limit laws. Namely, the limit of a sum is the sum of the limits. Hence,*

$$\lim_{x\to 0}\left(x^3 - 3x^2 + x - 5\right) = \lim_{x\to 0}\left(x^3\right) + \lim_{x\to 0}\left(-3x^2\right) + \lim_{x\to 0}\left(x\right) + \lim_{x\to 0}\left(-5\right).$$

Hint: *Take a look at the graph of the function*



Additional limit laws imply that

$$\lim_{x\to 0}\left(x^3 - 3x^2 + x - 5\right) = \left(\lim_{x\to 0}\left(x\right)\right)^3 - 3\cdot\lim_{x\to 0}\left(x^2\right) + \lim_{x\to 0}\left(x\right) - \lim_{x\to 0}\left(5\right).$$

Hint: *Evaluating* $\lim_{x\to 0}\left(x^3 - 3x^2 + x - 5\right) = \left(\lim_{x\to 0}\left(x\right)\right)^3 - 3\cdot\lim_{x\to 0}\left(x^2\right) + \lim_{x\to 0}\left(x\right) - \lim_{x\to 0}\left(5\right)$ *we see the answer is* 5, *since, as we know,* $\lim_{x\to 0}\left(x\right) = 0$.