

1) Область определения функции:  $x \in (-\infty; +\infty)$

2) Нули функции:  $x=0$   $y=-1$

$$y=0 \Rightarrow x^3 - x^2 + x - 1 = 0$$

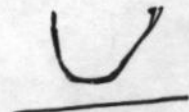
$$x^2(x-1) + (x-1) = (x^2+1)(x-1) = 0$$

$$\begin{aligned} x^2+1 &= 0 \quad \text{?} \\ x-1 &= 0 \\ x &= 1 \end{aligned}$$

3)  $y' = 3x^2 - 2x + 1 = 0$

$D = 4 - 12 < 0$  - нет корней.

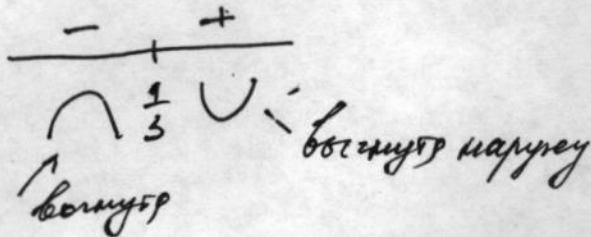
$a > 0$ , ветви вверх  $\Rightarrow$  функция ~~не~~ возрастает на всем интервале  $x$



4) Область значений функции:  $y \in (-1; +\infty)$

$$y'' = 6x - 2 = 0$$

$$\begin{aligned} 6x &= 2 \\ x &= \frac{1}{3} \end{aligned}$$



5) Область определения значений функции:  $y \in (-\infty; +\infty)$

~~Handwritten calculations for a trigonometric identity:~~

$$\begin{aligned} \sin^2 3 + \sin^2 4 + \sin^2 1 + \sin^2 4 + \cos^2 1 \\ \sin^2 3 + \sin^2 4 = 2 \\ \sin^2 3 \cdot 3 = 3\sqrt{3^2} = 3\sqrt{9} = 9 \\ \sin^2 4 \cdot 4 = 4\sqrt{4^2} = 4\sqrt{16} = 16 \\ \sin^2 3 \cdot 3 - \sin^2 4 \cdot 4 = 9 - 16 = -7 \end{aligned}$$

Handwritten calculations for a system of linear equations:

$$\begin{aligned} \begin{cases} x_1 + x_2 = 3 \\ 3x_1 + 2x_2 = 14 \end{cases} \Rightarrow \begin{cases} x_1 + x_2 = 3 \cdot 3 = 9 \\ 3x_1 + 2x_2 = 14 \end{cases} \\ \begin{matrix} 3x_1 + 3x_2 = 9 \\ 3x_1 + 2x_2 = 14 \end{matrix} \Rightarrow \begin{matrix} 3x_1 + 3x_2 = 9 \\ -x_2 = -5 \end{matrix} \\ \begin{matrix} x_2 = 5 \\ x_1 + 5 = 3 \end{matrix} \Rightarrow \begin{matrix} x_2 = 5 \\ x_1 = -2 \end{matrix} \\ m = 3 \cdot (-5) = -15 \end{aligned}$$