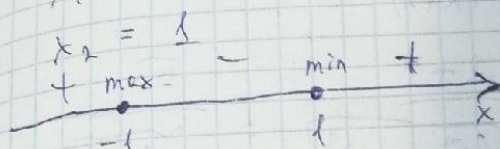


Задорожний Антон 219/5
Вариант 3.

$$1. y = 2x^3 - 6x.$$

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

$$x_1 = -1$$



Ответ: $t_{\max} = -1$

$t_{\min} = 1$

$$2. S(t) = \frac{1}{4}(t^4 - 4t^3 + 2t^2 - 12t)$$

$$S(t) = \frac{1}{4}t^4 - t^3 + \frac{1}{2}t^2 - 3t$$

$$S'(t) = t^3 - 3t^2 + t - 3$$

$$S''(t) = t^2 + t - 3t - 3$$

$$S'(t) = t(t^2 + 1) - 3(t^2 + 1)$$

$$S'(t) = (t-3)(t^2+1); S'(t) = 0$$

$$t-3=0 \quad t^2+1 \neq 0$$

$$t = 3$$

Ответ: 6 машин 3.

$$H_{13} = \frac{1}{-1-2} = 0-2 = -2 \quad H_{12} = -\frac{1-3}{-1-3} = -3-3 = 6$$

$$H_{21} = -\frac{2-0}{0-3} = -6-0 = -6$$

$$3. f = \sqrt[3]{t^2 + t + 2}, \text{ bzw. } f'(2)$$

$$f = (t^2 + t + 2)^{\frac{1}{3}}$$

$$f' = (2t + 1) \cdot \frac{1}{3} \cdot (t^2 + t + 2)^{-\frac{2}{3}}$$

$$f' = \frac{2t + 1}{3 \sqrt[3]{(t^2 + t + 2)^2}}$$

$$f'(2) = \frac{2 \cdot 2 + 1}{3 \sqrt[3]{(2^2 + 2 + 2)^2}} = \frac{5}{3 \sqrt[3]{(4+4)^2}} =$$

$$\frac{5}{3 \sqrt[3]{8^2}} = \frac{5}{3 \cdot 2^2} = \frac{5}{12}$$

Antwort: $\frac{5}{12}$

$$4. g = (\lg 3x)^{\sin 6x}$$

$$g' = \left((e^{\ln(\lg(3x))})^{\sin 6x} \right)$$

$$g' = (e^{\ln(\lg(3x)) \sin 6x})$$

$$\ln g = \ln(\lg(3x)) \sin 6x$$

$$g'(e^g) \cdot g' = \ln(\ln(\lg(3x))) \sin 6x$$

$$e^{\frac{1}{\sqrt{3x}}} \cdot y' = \ln(\sqrt{3x}) \sin 6x$$

$$e^{\frac{1}{\sqrt{3x}}} \cdot \left(\frac{1}{\sqrt{3x}} \cdot \sec(6x)^2 \cdot 3 \sin(6x) + \ln(\sqrt{3x}) \cos 6x \cdot 6 \right)$$

$$e^{\ln(\sqrt{3x}) \sin 6x} \cdot \left(\frac{1}{\sqrt{3x}} \sec(6x)^2 + 3 \sin(6x) \dots \right)$$

$$6 \tan(3x) \sin 6x + 6 \ln(\sqrt{3x}) + \frac{1}{\sqrt{3x}} \sin 6x \cos 6x$$

$$\text{Отсюда } y' = 6 \tan(3x) \sin 6x + 6 \ln(\sqrt{3x}) + \frac{1}{\sqrt{3x}} \sin 6x \cos 6x$$

$$5. \lim_{x \rightarrow 0} (e^x + 1)^{\frac{1}{x}}$$

$x \neq 0$. Выяс. эквив. предел, при

$$x \rightarrow 0+, e^x \rightarrow 1, \sqrt{x} e^x + 1, \text{ при } x > 0; \lim_{x \rightarrow 0+} (e^x + 1)^{\frac{1}{x}} = +\infty$$

$$\text{при } x \rightarrow 0- e^x \rightarrow 1, \sqrt{x} e^x + 1, \text{ при } x < 0; \lim_{x \rightarrow 0-} (e^x + 1)^{\frac{1}{x}} = 0$$

$$H21 = -\sqrt[0]{0} = -6 - 0 = -6$$