$$f(x) = \frac{-1}{6} \cdot x^3 + \frac{1}{3} \cdot x^2 + \frac{1}{6} \cdot x + 3$$

$$\lim_{x \to 3} \frac{f(x) - f(3)}{x - 3}$$

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$$\lim_{x \to 3} \frac{f(x) - f(3)}{x - 3} = \lim_{h \to 0} \frac{f(3 + h) - f(3)}{(3 + h) - 3}$$

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$$\lim_{x \to 3}\frac{f(x)-f(3)}{x-3}=\lim_{h \to 0}\frac{f(3+h)-f(3)}{(3+h)-3}=\lim_{h \to 0}\frac{f(3+h)-f(3)}{h}$$

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$$\lim_{x \to 3} \frac{f(x) - f(3)}{x - 3} = \lim_{h \to 0} \frac{f(3 + h) - f(3)}{(3 + h) - 3} = \lim_{h \to 0} \frac{f(3 + h) - f(3)}{h}$$

$$\frac{\left[\frac{-1}{6}\cdot(3 + h)^3 + \frac{1}{3}\cdot(3 + h)^2 + \frac{1}{6}\cdot(3 + h) + 3\right] - \left(\left(\frac{-1}{6}\cdot 3^3 + \frac{1}{3}\cdot 3^2 + \frac{1}{6}\cdot 3 + 3\right)\right)}{h} \text{ entwickeln}, h \rightarrow \frac{-7}{3} - \frac{7}{6}\cdot h - \frac{1}{6}\cdot h^2$$

$$f(x)=\frac{-1}{6}\cdot x^3+\frac{1}{3}\cdot x^2+\frac{1}{6}\cdot x+3$$

$$\lim_{x\to 3}\frac{f(x)-f(3)}{x-3}=\lim_{h\to 0}\frac{f(3+h)-f(3)}{(3+h)-3}=\lim_{h\to 0}\frac{f(3+h)-f(3)}{h}$$

$$\frac{\left[\frac{-1}{6}\cdot(3+h)^3+\frac{1}{3}\cdot(3+h)^2+\frac{1}{6}\cdot(3+h)+3\right]-\left(\left(\frac{-1}{6}\cdot 3^3+\frac{1}{3}\cdot 3^2+\frac{1}{6}\cdot 3+3\right)\right)}{h}\ \text{entwickeln}, h \ \to \frac{-7}{3}-\frac{7}{6}\cdot h-\frac{1}{6}\cdot h^2$$

$$\lim_{h\to 0}\left(\frac{-7}{3}-\frac{7}{6}\cdot h-\frac{1}{6}\cdot h^2\right)\ \text{vereinfachen}\ \to \frac{-7}{3}$$

Also: Die Steigung der Tangente im Punkt P(3|f(3) beträgt: m_t=-7/3