

TAYLORŮV POLYNOM FUNKCE JEDNÉ PROMĚNNÉ

Napište Taylorův polynom stupně funkce f stupně n v bodě x_0 :

1. $f(x) = \ln(1 - x)$, $x_0 = 0$, $n = 4$ $[T_4(x) = -x - \frac{x^2}{2} - \frac{x^3}{3} - \frac{x^4}{4}]$
2. $f(x) = \sqrt[5]{5x + 1}$, $x_0 = 0$, $n = 4$ $[T_4(x) = 1 + x - 2x^2 + 6x^3 - 21x^4]$
3. $f(x) = \operatorname{tg} x$, $x_0 = 0$, $n = 3$ $[T_3(x) = x + \frac{x^3}{3}]$
4. $f(x) = \operatorname{tg} x$, $x_0 = \frac{\pi}{4}$, $n = 3$ $[T_3(x) = 1 + 2(x - \frac{\pi}{4}) + 2(x - \frac{\pi}{4})^2 + \frac{8}{3}(x - \frac{\pi}{4})^3]$
5. $f(x) = \sin(x)$, $x_0 = 0$, $n = 6$ $[T_6(x) = x - \frac{1}{6}x^3 + \frac{1}{120}x^5]$
6. $f(x) = \ln(\frac{1-x}{1+x})$, $x_0 = 0$, $n = 6$ $[T_6(x) = -2x - \frac{2}{3}x^3 - \frac{2}{5}x^5]$
7. $f(x) = x^2 \cos(x)$, $x_0 = 0$, $n = 6$ $[T_6(x) = x^2 - \frac{1}{2}x^4 + \frac{1}{24}x^6]$
8. $f(x) = \operatorname{tg}(x)$, $x_0 = 0$, $n = 5$ $[T_5(x) = x + \frac{1}{3}x^3 + \frac{2}{15}x^5]$
9. $f(x) = \sqrt{2x + 1}$, $x_0 = 0$, $n = 5$ $[T_5(x) = 1 + x - \frac{1}{2}x^2 + \frac{1}{2}x^3 - \frac{5}{8}x^4 + \frac{7}{8}x^5]$
10. $f(x) = x \arcsin(x)$, $x_0 = 0$, $n = 6$ $[T_6(x) = x^2 + \frac{1}{6}x^4 + \frac{3}{40}x^6]$
11. $f(x) = e^x$, $x_0 = 0$, $n = 5$ $[T_5(x) = 1 + x + \frac{1}{2}x^2 + \frac{1}{6}x^3 + \frac{1}{24}x^4 + \frac{1}{120}x^5]$
12. $f(x) = \arctan(x)$, $x_0 = 0$, $n = 4$ $[T_4(x) = x - \frac{1}{3}x^3]$
13. $f(x) = \ln(x)$, $x_0 = 1$, $n = 6$
 $[T_6(x) = x - 1 - \frac{1}{2}(x - 1)^2 + \frac{1}{3}(x - 1)^3 - \frac{1}{4}(x - 1)^4 + \frac{1}{5}(x - 1)^5 - \frac{1}{6}(x - 1)^6]$
14. $f(x) = \ln(\sin(x))$, $x_0 = \frac{1}{2}\pi$, $n = 6$
 $[T_6(x) = -\frac{1}{2}(x - \frac{1}{2}\pi)^2 - \frac{1}{12}(x - \frac{1}{2}\pi)^4 - \frac{1}{45}(x - \frac{1}{2}\pi)^6]$
15. $f(x) = x^3 \ln(x)$, $x_0 = 1$, $n = 5$
 $[T_5(x) = x - 1 + \frac{5}{2}(x - 1)^2 + \frac{11}{6}(x - 1)^3 + \frac{1}{4}(x - 1)^4 - \frac{1}{20}(x - 1)^5]$
16. $f(x) = e^{(2x-x^2)}$, $x_0 = 0$, $n = 5$ $[T_5(x) = 1 + 2x + x^2 - \frac{2}{3}x^3 - \frac{5}{6}x^4 - \frac{1}{15}x^5]$
17. $f(x) = (1 + x) \ln(\frac{x}{2})$, $x_0 = 2$, $n = 5$
 $[T_5(x) = \frac{3}{2}(x - 2) + \frac{1}{8}(x - 2)^2 - \frac{1}{192}(x - 2)^4 + \frac{1}{320}(x - 2)^5]$
18. $f(x) = \sqrt{x}$, $x_0 = 1$, $n = 4$
 $[T_4(x) = 1 + \frac{1}{2}(x - 1) - \frac{1}{8}(x - 1)^2 + \frac{1}{16}(x - 1)^3 - \frac{5}{128}(x - 1)^4]$
19. $f(x) = x \arcsin(x) + \sqrt{1 - x^2}$, $x_0 = 0$, $n = 4$ $[T_4(x) = 1 + \frac{1}{2}x^2 + \frac{1}{24}x^4]$
20. $f(x) = x^2 e^{(1-x)}$, $x_0 = 1$, $n = 4$
 $[T_4(x) = 1 + x - 1 - \frac{1}{2}(x - 1)^2 - \frac{1}{6}(x - 1)^3 + \frac{5}{24}(x - 1)^4]$