

1. Oldja meg az alábbi kezdetérték feladatot!

(a)

$$\begin{aligned}x'(t) &= \frac{x^3(t)}{\cos^2(t)}, \\x(0) &= 1.\end{aligned}$$

(b)

$$\begin{aligned}x'(t) &= \frac{1}{t \cdot x^3(t)}, \\x(-1) &= 1.\end{aligned}$$

(c)

$$\begin{aligned}x'(t) + 2x(t) &= t, \\x(0) &= \frac{3}{4}.\end{aligned}$$

(d)

$$\begin{aligned}x'(t) &= \frac{1}{\sin\left(\frac{x(t)}{t}\right)} + \frac{x(t)}{t}, \\x(2) &= \frac{2\pi}{3}.\end{aligned}$$

(e)

$$\begin{aligned}x'(t) &= \frac{x(t)}{\ln(x(t)) \cdot t^3}, \\x(-1) &= \frac{1}{e}.\end{aligned}$$

(f)

$$\begin{aligned}x'(t) + \frac{1}{2t}x(t) &= -\frac{3}{2}t \frac{1}{x(t)}, \\x(1) &= 2.\end{aligned}$$

(g)

$$\begin{aligned}x'(t) + \frac{1}{t}x(t) &= \sin(2t), \\x\left(-\frac{\pi}{4}\right) &= 0.\end{aligned}$$

(h)

$$\begin{aligned}x'(t) &= \frac{x(t)}{t} + \frac{1}{2\left(\frac{x(t)}{t} - 1\right)}, \\x(2) &= 4.\end{aligned}$$

(i)

$$\begin{aligned}x'(t) &= \frac{1 + x^2(t)}{1 + t}, \\x(1) &= 1.\end{aligned}$$

(j)

$$\begin{aligned}x'(t) + 2tx(t) &= tx^3(t), \\x(0) &= \frac{1}{2}.\end{aligned}$$

(k)

$$\begin{aligned}x'(t) &= \frac{1}{2x(t) \cdot e^{x^2(t)} \cdot \cos^2(t)}, \\x\left(\frac{\pi}{4}\right) &= -1.\end{aligned}$$

(l)

$$\begin{aligned}x'(t) &= x^3(t) \operatorname{tg}(t), \\x(0) &= 1.\end{aligned}$$

(m)

$$\begin{aligned}x'(t) &= \frac{x^3(t)}{t(t-1)}, \\x(2) &= -1.\end{aligned}$$

(n)

$$\begin{aligned}x'(t) &= \frac{x^3(t)}{t^2}, \\x(-1) &= 1.\end{aligned}$$

(o)

$$\begin{aligned}x'(t) &= \frac{1}{t \cdot x^3(t)}, \\x(-1) &= 1.\end{aligned}$$

(p)

$$\begin{aligned}x'(t) + \frac{2}{t}x(t) &= e^{\frac{1}{t}}, \\x(1) &= 0.\end{aligned}$$

2. Adja meg az alábbi differenciálegyenlet összes megoldását!

(a)

$$x''(t) - 4x'(t) + 4x(t) = \sin(t).$$

(b)

$$x''(t) + x'(t) - 2x(t) = te^t.$$

(c)