

Řešte rovnice ve tvaru totálního diferenciálu:

1. $\frac{dx}{y} - \frac{x dy}{y^2} = 0.$
2. $\frac{y dx}{2\sqrt{x}} + \sqrt{x} dy = 0.$
3. $-\frac{y dx}{x^2+y^2} + \frac{x dy}{x^2+y^2} = 0.$
4. $\cos(x+1) dx = 0.$
5. $\frac{\sqrt{y} dx}{\sqrt{-(x-1)(x+1)}} + \frac{(\arcsin(x)+2\sqrt{y}) dy}{2\sqrt{y}} = 0.$
6. $-ye^{\frac{y}{x}} x^{-2} dx + e^{\frac{y}{x}} x^{-1} dy = 0.$
7. $\left(\frac{y}{x^2} - x^{-2}\right) dx + \frac{dy}{x} = 0.$
8. $(y^2 - y) dx + xy dy = 0.$
9. $-\sin(x) \cos(y) dx - (\cos(y))^2 dy = 0.$
10. $-\sin(xy) dx - \frac{\sin(xy) x dy}{y} = 0.$
11. $\left(x^{-1} + \frac{y}{x}\right) dx + (1 + x^{-1}) dy = 0.$
12. $\left(\frac{2x}{y^2} - \frac{1}{yx^2}\right) dx + \left(3 + \frac{1}{y^2 x}\right) dy = 0.$
13. $\left(-\frac{y^2}{x^2} + 1\right) dx + \left(2y^3 - \frac{2x}{y}\right) dy = 0.$
14. $\frac{dx}{xy} + 2\frac{dy}{x} = 0, \mu = \mu(xy).$
15. $-y^3 x^2 dx + \left(-x^2 - x^3 y^2 - \frac{2x^2}{y}\right) dy = 0, \mu = \mu(xy).$
16. $\left(-\frac{1}{x^4 y^3} + \frac{1}{x^4 y^2}\right) dx - \frac{dy}{y^4 x^3} = 0, \mu = \mu(xy).$
17. $\frac{dx}{xy^3} + \frac{dy}{yx^3} = 0, \mu = \mu(xy).$
18. $\frac{x^3 dx}{y^2} - \frac{x^2 dy}{y^5} = 0, \mu = \mu(x/y).$
19. $\left(-\frac{y}{x^3} + \frac{y^3}{x}\right) dx + 2y^2 dy = 0, \mu = \mu(y/x).$
20. $\frac{x dx}{y} + \left(-\frac{x^3}{y^5} - \frac{2x^2}{y^2}\right) dy = 0, \mu = \mu(x/y).$
21. $\left(x^{-1} + \frac{y^2}{x^3}\right) dx + \left(-y^{-1} - \frac{y}{x^2}\right) dy = 0, \mu = \mu(y/x).$
22. $\left(\frac{y}{x} - \frac{y \cos(x)}{x}\right) dx + \frac{y dy}{x} = 0.$
23. $(y^{-1} + x^{-1}) dx + (y^{-1} + x^{-1}) dy = 0, \mu = \mu(xy).$

Výsledky:

Není-li řečeno jinak, hledejte integrační faktor jako funkci x nebo y .

- 1) $V = \frac{x}{y}$.
- 2) $V = y\sqrt{x}$.
- 3) $V = \arctan\left(\frac{y}{x}\right)$.
- 4) $V = \sin(x + 1)$.
- 5) $V = \arcsin(x)\sqrt{y} + y$.
- 6) $V = e^{\frac{y}{x}}$.
- 7) $\mu = x^2, V = xy - x$.
- 8) $\mu = y^{-1}, V = xy - x$.
- 9) $\mu = (\cos(y))^{-1}, V = \cos(x) - \sin(y)$.
- 10) $\mu = y, V = \cos(xy)$.
- 11) $\mu = x, V = x + y + xy$.
- 12) $\mu = y^2, V = x^2 + y^3 + \frac{y}{x}$.
- 13) $\mu = y^{-2}, V = x^{-1} + y^2 + \frac{x}{y^2}$.
- 14) $\mu = xy, V = x + y^2$.
- 15) $\mu = \frac{1}{x^2y^2}, V = y^{-1} - xy + y^{-2}$.
- 16) $\mu = x^2y^2, V = \frac{1}{xy} - x^{-1}$.
- 17) $\mu = x^3y^3, V = x^3 + y^3$.
- 18) $\mu = \frac{y^2}{x^2}, V = x^2 + y^{-2}$.
- 19) $\mu = \frac{x}{y}, V = x^{-1} + xy^2$.
- 20) $\mu = \frac{y^3}{x^3}, V = y^{-1} - \frac{y^2}{x}$.
- 21) $\mu = \frac{x}{y}, V = \frac{x}{y} - \frac{y}{x}$.
- 22) $\mu = \frac{x}{y}, V = x + y - \sin(x)$.
- 23) $\mu = xy, V = (x + y)^2$.