

Завдання для самостійної роботи

Зінтегрувати диференціальні рівняння:

301. $xy' + x^2 + xy - y = 0.$ **302.** $2xy' + y^2 = 1.$

303. $(2xy^2 - y) dx + x dy = 0.$

304. $(xy' + y)^2 = x^2 y'.$ **305.** $y - y' = y^2 + xy'.$

306. $(x + 2y^3)y' = y.$ **307.** $y'^3 - y'e^{2x} = 0.$

308. $x^2 y' = y(x + y).$

309. $(1 - x^2) dy + xy dx = 0.$

310. $y'^2 + 2(x - 1)y' - 2y = 0.$

311. $y + y' \ln^2 y = (x + 2 \ln y)y'.$

312. $x^2 y' - 2xy = 3y.$

313. $x + yy' = y^2(1 + y'^2).$

314. $y = (xy' + 2y)^2.$

315. $y' = \frac{1}{x - y^2}.$

316. $y'^3 + (3x - 6)y' = 3y.$

317. $x - \frac{y}{y'} = \frac{2}{y}.$

318. $2y'^3 - 3y'^2 + x = y.$

319. $(x + y)^2 y' = 1.$

320. $2x^3 yy' + 3x^2 y^2 + 7 = 0.$

321. $\frac{dx}{x} = \left(\frac{1}{y} - 2x \right) dy.$

322. $xy' = e^y + 2y'.$

323. $2(x - y^2) dy = y dx.$

324. $x^2 y'^2 + y^2 = 2x(2 - yy').$

325. $dy + (xy - xy^3) dx = 0.$

326. $2x^2y' = y^2(2xy' - y).$

327. $\frac{y - xy'}{x + yy'} = 2.$

328. $x(x - 1)y' + 2xy = 1.$

329. $xy(xy' - y)^2 + 2y' = 0.$

330. $(1 - x^2)y' - 2xy^2 = xy.$

331. $y' + y = xy^3.$

332. $(xy^4 - x) dx + (y + xy) dy = 0.$

333. $(\sin x + y) dy + (y \cos x - x^2) dx = 0.$

334. $3y'^3 - xy' + 1 = 0.$

335. $yy' + y^2 \operatorname{ctg} x = \cos x.$

336. $(e^y + 2xy) dx + (e^y + x)x dy = 0.$

337. $xy'^2 = y - y'.$

338. $x(x + 1)(y' - 1) = y.$

339. $y(y - xy') = \sqrt{x^4 + y^4}.$

340. $xy' + y = \ln y'.$

341. $x^2(dy - dx) = (x + y)y dx.$

342. $y' + x\sqrt[3]{y} = 3y.$

343. $(x \cos y + \sin 2y)y' = 1.$

344. $y'^2 - yy' + e^x = 0.$

345. $y' = \frac{x}{y}e^{2x} + y.$

346. $(xy' - y)^3 = y'^3 - 1.$

347. $(4xy - 3)y' + y^2 = 1.$

348. $y'\sqrt{x} = \sqrt{y-x} + \sqrt{x}.$

349. $xy' = 2\sqrt{y}\cos x - 2y.$

350. $3y'^4 = y' + y.$

351. $y^2(y - xy') = x^3y'.$

352. $y' = (4x + y - 3)^2.$

353. $(\cos x - x \sin x)y \, dx + (x \cos x - 2y) \, dy = 0.$

354. $x^2y'^2 - 2xyy' = x^2 + 3y^2.$

355. $\frac{xy'}{y} + 2xy \ln x + 1 = 0.$

356. $xy' = x\sqrt{y-x^2} + 2y.$

357. $(1 - x^2y) \, dx + x^2(y - x) \, dy = 0.$

358. $(2xe^y + y^4)y' = ye^y.$

359. $xy'(\ln y - \ln x) = y.$

360. $2y' = x + \ln y'.$

361. $(2x^2y - 3y^2)y' = 6x^2 - 2xy^2 + 1.$

362. $yy' = 4x + 3y - 2.$

363. $y^2y' + x^2 \sin^3 x = y^3 \operatorname{ctg} x.$

364. $2xy' - y = \sin y'.$

365. $(x^2y^2 + 1)y + (xy - 1)^2xy' = 0.$

366. $y \sin x + y' \cos x = 1.$

$$367. x \, dy - y \, dx = x \sqrt{x^2 + y^2} \, dx.$$

$$368. y^2 + x^2 y'^5 = xy(y'^2 + y'^3).$$

$$369. y' = \sqrt[3]{2x - y} + 2.$$

$$370. \left(x - y \cos \frac{y}{x}\right) dx + x \cos \frac{y}{x} dy = 0.$$

$$371. 2 \left(x^2 y + \sqrt{1 + x^4 y^2}\right) dx + x^3 dy = 0.$$

$$372. (y' - x\sqrt{y})(x^2 - 1) = xy.$$

$$373. y'^3 + (y'^2 - 2y')x = 3y' - y.$$

$$374. (2x + 3y - 1) dx + (4x + 6y - 5) dy = 0.$$

$$375. (2xy^2 - y) dx + (y^2 + x + y) dy = 0.$$

$$376. y = y' \sqrt{1 + y'^2}.$$

$$377. y^2 = (xyy' + 1) \ln x.$$

$$378. 4y = x^2 + y'^2.$$

$$379. 2x \, dy + y \, dx + xy^2(x \, dy + y \, dx) = 0.$$

$$380. x \, dx + (x^2 \operatorname{ctg} y - 3 \cos y) dy = 0.$$

$$381. x^2 y'^2 - 2(xy - 2)y' + y^2 = 0.$$

$$382. xy' + 1 = e^{x-y}.$$

$$383. y' = \operatorname{tg}(y - 2x).$$

$$384. 3x^2 - y = y' \sqrt{x^2 + 1}.$$

$$385. yy' + xy = x^3.$$

$$386. x(x - 1)y' + y^3 = xy.$$

$$387. xy' = 2y + \sqrt{1 + y'^2}.$$

$$388. (2x + y + 5)y' = 3x + 6.$$

$$389. y' + \operatorname{tg} y = x \sec y.$$

$$390. y'^4 = 4y(xy' - 2y)^2.$$

$$391. y' = \frac{y^2 - x}{2y(x + 1)}.$$

$$392. xy' = x^2 e^{-y} + 2.$$

$$393. y' = 3x + \sqrt{y - x^2}.$$

$$394. x \, dy - 2y \, dx + xy^2(2x \, dy + y \, dx) = 0.$$

$$395. (x^3 - 2xy^2) \, dx + 3x^2y \, dy = x \, dy - y \, dx.$$

$$396. (yy')^3 = 27x(y^2 - 2x^2).$$

$$397. y' - 8x\sqrt{y} = \frac{4xy}{x^2 - 1}.$$

$$398. [2x - \ln(y + 1)] \, dx - \frac{x + y}{y + 1} \, dy = 0.$$

$$399. xy' = (x^2 + \operatorname{tg} y) \cos^2 y.$$

$$400. x^2(y - xy') = yy'^2.$$

$$401. y' = \frac{3x^2}{x^3 + y + 1}.$$

$$402. y' = \frac{(1 + y)^2}{x(y + 1) - x^2}.$$

$$403. (y - 2xy')^2 = 4yy'^3.$$

$$404. 6x^5y \, dx + (y^4 \ln y - 3x^6) \, dy = 0.$$

$$405. y' = \frac{1}{2}\sqrt{x} + \sqrt[3]{y}.$$

$$406. 2xy' + 1 = y + \frac{x^2}{y - 1}.$$

$$407. yy' + x = \frac{1}{2} \left(\frac{x^2 + y^2}{x} \right)^2.$$

$$408. y' = \left(\frac{3x + y^3 - 1}{y} \right)^2.$$

$$409. \left(x\sqrt{y^2 + 1} + 1 \right) (y^2 + 1) dx = xy dy.$$

$$410. (x^2 + y^2 + 1)yy' + (x^2 + y^2 - 1)x = 0.$$

$$411. y^2(x - 1) dx = x(xy + x - 2y) dy.$$

$$412. (xy' - y)^2 = x^2y^2 - x^4.$$

$$413. xyy' - x^2\sqrt{y^2 + 1} = (x + 1)(y^2 + 1).$$

$$414. (x^2 - 1)y' + y^2 - 2xy + 1 = 0.$$

$$415. y' \operatorname{tg} y + 4x^3 \cos y = 2x.$$

$$416. (xy' - y)^2 = y'^2 - \frac{2yy'}{x} + 1.$$

$$417. (x + y)(1 - xy) dx + (x + 2y) dy = 0.$$

$$418. (3xy + x + y)y dx + (4xy + x + 2y)x dy = 0.$$

$$419. (x^2 - 1) dx + (x^2y^2 + x^3 + x) dy = 0.$$

$$420. x(y'^2 + e^{2y}) = -2y'.$$