Індивідуальне домашнє завдання (ІДЗ)

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.** $y' = \dfrac{1}{x - y^2}.$

316. $y'^3 + (3x - 6)y' = 3y.$ **317.** $x - \dfrac{y}{y'} = \dfrac{2}{y}.$

318. $2y'^3 - 3y'^2 + x = y.$ **319.** $(x + y)^2 y' = 1.$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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