



5.4 EXERCISES

Practice Makes Perfect

Divide Monomials

In the following exercises, divide the monomials.

288. $15r^4s^9 \div (15r^4s^9)$

289. $20m^8n^4 \div (30m^5n^9)$

290. $\frac{18a^4b^8}{-27a^9b^5}$

291. $\frac{45x^5y^9}{-60x^8y^6}$

292. $\frac{(10m^5n^4)(5m^3n^6)}{25m^7n^5}$

293. $\frac{(-18p^4q^7)(-6p^3q^8)}{-36p^{12}q^{10}}$

294. $\frac{(6a^4b^3)(4ab^5)}{(12a^2b)(a^3b)}$

295. $\frac{(4u^2v^5)(15u^3v)}{(12u^3v)(u^4v)}$

Divide a Polynomial by a Monomial

In the following exercises, divide each polynomial by the monomial.

296. $(9n^4 + 6n^3) \div 3n$

297. $(8x^3 + 6x^2) \div 2x$

298. $(63m^4 - 42m^3) \div (-7m^2)$

299. $(48y^4 - 24y^3) \div (-8y^2)$

300. $\frac{66x^3y^2 - 110x^2y^3 - 44x^4y^3}{11x^2y^2}$

301. $\frac{72r^5s^2 + 132r^4s^3 - 96r^3s^5}{12r^2s^2}$

302. $\frac{10x^2 + 5x - 4}{-5x}$

303. $\frac{20y^2 + 12y - 1}{-4y}$

Divide Polynomials using Long Division

In the following exercises, divide each polynomial by the binomial.

304. $(y^2 + 7y + 12) \div (y + 3)$

305. $(a^2 - 2a - 35) \div (a + 5)$

306. $(6m^2 - 19m - 20) \div (m - 4)$

307. $(4x^2 - 17x - 15) \div (x - 5)$

308. $(q^2 + 2q + 20) \div (q + 6)$

309. $(p^2 + 11p + 16) \div (p + 8)$

310. $(3b^3 + b^2 + 4) \div (b + 1)$

311. $(2n^3 - 10n + 28) \div (n + 3)$

312. $(z^3 + 1) \div (z + 1)$

313. $(m^3 + 1000) \div (m + 10)$

314. $(64x^3 - 27) \div (4x - 3)$

315. $(125y^3 - 64) \div (5y - 4)$

Divide Polynomials using Synthetic Division

In the following exercises, use synthetic Division to find the quotient and remainder.

316. $x^3 - 6x^2 + 5x + 14$ is divided by $x + 1$

317. $x^3 - 3x^2 - 4x + 12$ is divided by $x + 2$

318. $2x^3 - 11x^2 + 11x + 12$ is divided by $x - 3$

319. $2x^3 - 11x^2 + 16x - 12$ is divided by $x - 4$

320. $x^4 + 13x^2 + 13x + 3$ is divided by $x + 3$

321. $x^4 + x^2 + 6x - 10$ is divided by $x + 2$

316 - 321. Use separate paper.

322. $2x^4 - 9x^3 + 5x^2 - 3x - 6$ is divided by $x - 4$

323. $3x^4 - 11x^3 + 2x^2 + 10x + 6$ is divided by $x - 3$

Divide Polynomial Functions

In the following exercises, divide.

324. For functions $f(x) = x^2 - 13x + 36$ and $g(x) = x - 4$, find (a) $\left(\frac{f}{g}\right)(x)$ (b) $\left(\frac{f}{g}\right)(-1)$

325. For functions $f(x) = x^2 - 15x + 45$ and $g(x) = x - 9$, find (a) $\left(\frac{f}{g}\right)(x)$ (b) $\left(\frac{f}{g}\right)(-5)$

326. For functions $f(x) = x^3 + x^2 - 7x + 2$ and $g(x) = x - 2$, find (a) $\left(\frac{f}{g}\right)(x)$ (b) $\left(\frac{f}{g}\right)(2)$

327. For functions $f(x) = x^3 + 2x^2 - 19x + 12$ and $g(x) = x - 3$, find (a) $\left(\frac{f}{g}\right)(x)$ (b) $\left(\frac{f}{g}\right)(0)$

328. For functions $f(x) = x^2 - 5x + 2$ and $g(x) = x^2 - 3x - 1$, find (a) $(f \cdot g)(x)$ (b) $(f \cdot g)(-1)$

329. For functions $f(x) = x^2 + 4x - 3$ and $g(x) = x^2 + 2x + 4$, find (a) $(f \cdot g)(x)$ (b) $(f \cdot g)(1)$

Use the Remainder and Factor Theorem

In the following exercises, use the Remainder Theorem to find the remainder.

330. $f(x) = x^3 - 8x + 7$ is divided by $x + 3$

331. $f(x) = x^3 - 4x - 9$ is divided by $x + 2$

332. $f(x) = 2x^3 - 6x - 24$ divided by $x - 3$

333. $f(x) = 7x^2 - 5x - 8$ divided by $x - 1$

In the following exercises, use the Factor Theorem to determine if $x - c$ is a factor of the polynomial function.

334. Determine whether $x + 3$ a factor of $x^3 + 8x^2 + 21x + 18$

335. Determine whether $x + 4$ a factor of $x^3 + x^2 - 14x + 8$

336. Determine whether $x - 2$ a factor of $x^3 - 7x^2 + 7x - 6$

337. Determine whether $x - 3$ a factor of $x^3 - 7x^2 + 11x + 3$

Writing Exercises

338. James divides $48x + 6$ by 6 this way:
 $\frac{48x + 6}{6} = 48x$. What is wrong with his reasoning?

339. Divide $\frac{10x^2 + x - 12}{2x}$ and explain with words how you get each term of the quotient.

340. Explain when you can use synthetic division.

341. In your own words, write the steps for synthetic division for $x^2 + 5x + 6$ divided by $x - 2$.#330
-339

← meaning, don't divide. Plug in the value.

← the remainder = 0.

Use
Separate paper.