

Synthetic Division with Polynomials (ALG.POL.07)

Divide using synthetic division.

- $(7x^4 - 18x^3 + 14x^2 - 23x + 22) \div (x - 2)$
- $(3x^5 - 9x^4 + 8x^3 - 24x^2 - 3x + 9) \div (x - 3)$
- $(x^5 + 5x^4 - 6x^3 - x - 6) \div (x + 6)$
- $(x^7 + 5x^6 - x^4 - 5x^3 - 12x - 60) \div (x + 5)$
- $(3x^4 - 10x^3 - 8x^2 - 2) \div (x - 4)$
- $(2x^4 - 4x^3 - 11x^2 + 3x + 6) \div (x + 1)$
- $(8x^5 - 56x^4 + 5x^2 - 35x + 17) \div (x - 7)$
- $(x^3 + (1 - \sqrt{2})x^2 + (-12 - \sqrt{2})x + 12\sqrt{2}) \div (x - \sqrt{2})$
- $(2x^4 + (1 - 4\sqrt{6})x^3 - 3x^2 + 6\sqrt{6}x - 48\sqrt{6}) \div (x - 2\sqrt{6})$
- $(3x^3 + (13 - 3\sqrt{3})x^2 + (13 - 7\sqrt{3})x + \sqrt{3} - 2) \div (x + 2 - \sqrt{3})$

Divide using the extended version of synthetic division.

- $(10x^4 - 6x^3 - 40x^2 + 59x - 21) \div (5x - 3)$
- $(4x^4 - 9x^2 + 2) \div (2x - 3)$
- $(21x^5 + 56x^4 - 9x^3 - 24x^2 + 6x + 16) \div (3x + 8)$
- $(16x^3 + 42x^2 - 45x + 17) \div (2x + 7)$
- $(16x^3 - 8x^2 - 3x + 1) \div (4x - \sqrt{3})$
- $(18x^3 + 6\sqrt{5}x^2 - 32x - 15) \div (3x - 4 + \sqrt{5})$

Write the function in the form $f(x) = (x - k) \cdot q(x) + r$ for the given value of k .

17. $f(x) = 4x^3 - 17x^2 + 16x - 1, \quad k = 3$

18. $f(x) = 7x^4 + 49x^3 - 5x^2 - 33x + 10, \quad k = -7$

19. $f(x) = 5x^4 - 2x^3 - 10x^2 + 16x - 4, \quad k = \frac{2}{5}$

20. $f(x) = 6x^3 + 10x^2 - 9x - 13, \quad k = -\frac{5}{3}$

21. $f(x) = x^3 + 5x^2 - 3x - 17, \quad k = \sqrt{3}$

22. $f(x) = 4x^3 + 5x^2 + (40 + 10\sqrt{10})x + 410\sqrt{10}, \quad k = -2\sqrt{10}$

23. $f(x) = 3x^3 - 6x^2 - 15x + 9\sqrt{5} - 24, \quad k = 2 - \sqrt{5}$

24. $f(x) = 5x^4 + 7x^3 - 71x^2 + 47x - 75, \quad k = -1 - \sqrt{15}$