

Tutorials

Name each polynomial by degree and number of terms.

1) $1 + 6k^4$

2) $4 - 5n^5$

3) $5 + 7a^2 + 10a^3 + 10a$

4) 6

5) $6 - 6a^2 + 7a^3 + 3a$

6) $-7x^4 + 2x^5 + 8x^2$

Simplify each expression.

7) $(3x^2 - 7x^3 - 2x) - (3x^4 + 6x - x^2)$

8) $(7 - 6n^2 - 2n^3) + (-5n^2 + 2n^3 + 6)$

9) $(-4r^3 - 3r^4 - 6) + (3r^4 + 7r^3 + 1)$

10) $(-6x^3 + 2 - 6x^2) - (-5x^3 + 7x^2 + 6)$

11) $(k - 8 - 8k^4) + (2 - 7k^4 - 2k)$

12) $(-5n - 3 - 3n^3) - (2 + 5n^3 - 3n)$

Find each product.

13) $(3x + 1)(8x^2 - 6x + 7)$

14) $(7p - 5)(5p^2 - 8p - 2)$

15) $(7p^2 + 3p + 1)(p^2 + 7p + 8)$

16) $(n^2 + n - 2)(5n^2 + 2n + 5)$

17) $(5a^2 - 6a - 3)(4a^2 - 7a - 3)$

18) $(4x^2 - 3x - 7)(2x^2 - 4x - 5)$

Divide using long division.

19) $(10a^3 - 24a^2 + 10a + 2) \div (a - 2)$

20) $(p^3 + 5p^2 - 11p - 37) \div (p + 6)$

21) $(45k^3 - 8k^2 + 6k - 26) \div (9k - 7)$

22) $(5r^3 + 25r^2 + 15r - 54) \div (5r - 5)$

23) $(2x^3 - 17x^2 + 15x - 47) \div (x - 8)$

24) $(10x^3 - 44x^2 + 60x + 51) \div (10x + 6)$

Divide using synthetic division.

25) $(9p^3 + 11p^2 - 7p - 19) \div (p + 1)$

26) $(x^3 + 8x^2 - 23x - 35) \div (x + 10)$

27) $(4p^3 - 38p^2 - 29p + 84) \div (p - 10)$

28) $(5m^3 - 16m^2 + 4m + 21) \div (m - 2)$

Describe the end behavior of each function.

29) $f(x) = -x^5 + 4x^3 - x - 2$

30) $f(x) = x^4 - 2x^2 - 2x - 3$

31) $f(x) = -x^3 + 4x^2 - 3$

32) $f(x) = x^2 - 4x$

33) $f(x) = -x^4 + x^2 - x - 4$

34) $f(x) = x^3 - 7x^2 + 16x - 11$

State the maximum number of turns the graph of each function could make. Then sketch the graph. Approximate each real zero to the nearest tenth. Approximate the relative minima and relative maxima to the nearest tenth.

35) $f(x) = x^4 - 3x^2 + 2x + 1$

36) $f(x) = x^4 - 3x^2 + 3x - 2$

37) $f(x) = x^3 - 3x^2 + 2$

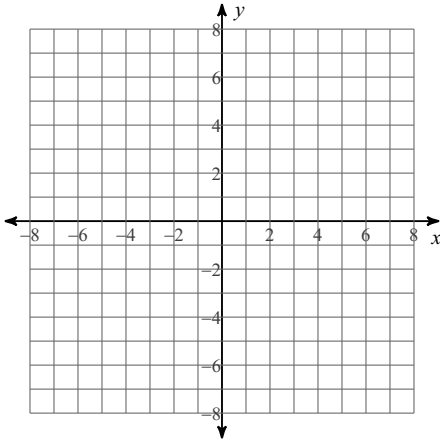
38) $f(x) = x^3 - 2x^2 + 4$

39) $f(x) = x^3 - 3x^2$

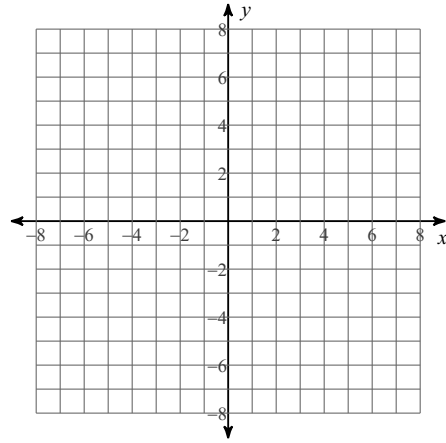
40) $f(x) = x^4 - x^2 - 1$

Sketch the graph of each function. State the domain, range, and intervals of increasing and decreasing.

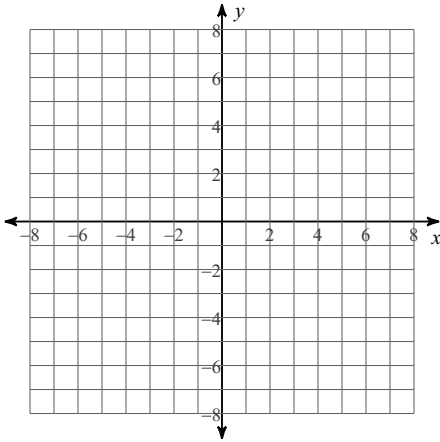
41) $f(x) = -x^4 + 3x^2 - x - 1$



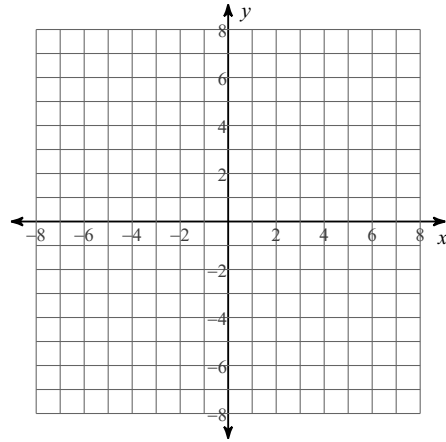
42) $f(x) = -x^4 + x^3 + 4x^2 - 4$



43) $f(x) = -x^4 - x^3 + 2x^2 + 2$



44) $f(x) = x^5 - 4x^3 + 3x + 3$



State the possible rational zeros for each function. Then find all rational zeros.

45) $f(x) = 2x^3 - x^2 - 10x$

46) $f(x) = 5x^3 + 24x^2 + 16x$

47) $f(x) = 2x^3 + 10x^2 + 11x$

48) $f(x) = x^3 - 9x^2 + 10x$

Evaluate each function at the given value. Tell what the answer means

49) $f(n) = n^3 - 6n - 18$ at $n = 3$

50) $f(n) = 2n^3 + 6n^2 - 6n + 7$ at $n = -4$

51) $f(a) = -3a^4 + 15a^3 + 12a^2 + 38a - 16$ at $a = 6$

52) $f(n) = 2n^3 - n^2 - 19n + 22$ at $n = 3$

Find all roots.

53) $5x^4 - 6x^3 + x^2 = 0$

54) $-8x^3 + 1 = 0$

55) $2x^3 + 7x^2 + 7x + 2 = 0$

56) $3x^4 - 22x^2 - 45 = 0$

Write a polynomial function of least degree with integral coefficients that has the given zeros.

57) 0, 3, 1

58) -4, 3, -1

59) -5, $3i$

60) 0, $-2i$, $2i$

61) $\frac{5}{4}$, $-\frac{3}{2}$, 0, -5

62) 1, $-\frac{5}{3}$, -2, 5