

Polynomial Functions EXERCISES

Factor each polynomial and state its zeros.

[1] $f(x) = x^4 - 10x^2 + 9$

[2] $f(x) = x^3 - 25x$

[3] $f(x) = x^5 - x^3$

[4] $f(x) = x^3 - 8$

[5] $f(x) = x^3 + 27$

[6] $f(x) = x^4 - x$

[7] $f(x) = 3x^5 + 24x^2$

[8] $f(x) = x^4 - 13x^2 + 36$

[9] $f(x) = x^4 - 8x^2 + 16$

[10] $f(x) = 16x^4 - 8x^2 + 1$

[11] $f(x) = x^3 - 2x^2 - x + 2$

[112] $f(x) = x^3 + 2x^2 - 4x - 8$

[13] $f(x) = x^3 - 4x^2 - 25x + 100$

[14] $f(x) = x^3 + 3x^2 - 16x - 48$

[15] $f(x) = x^4 + 2x^3 + 8x + 16$

[16] $f(x) = x^4 - 5x^3 - x + 5$

[7] $f(x) = x^4 - x^3 - 27x + 27$

[18] $f(x) = x^4 - 2x^3 + 125x - 250$

[19] $f(x) = 2x^3 + x^2 - 18x - 9$

[20] $f(x) = 3x^3 - 2x^2 - 300x + 200$

[21-23] Use synthetic substitution to evaluate each function at the given values.

[21] $f(x) = x^3 - x^2 + 2x - 3$

[a] $f(2) = \underline{\hspace{2cm}}$

[b] $f(-2) = \underline{\hspace{2cm}}$

[c] $f(1) = \underline{\hspace{2cm}}$

[22] $f(x) = x^3 - 4x^2 - 11x + 30$

[a] $f(-2) = \underline{\hspace{2cm}}$

[b] $f(-3) = \underline{\hspace{2cm}}$

[c] $f(5) = \underline{\hspace{2cm}}$

[23] $f(x) = x^4 + 2x^3 + 8x + 16$

[a] $f(1) = \underline{\hspace{2cm}}$

[b] $f(2) = \underline{\hspace{2cm}}$

[c] $f(-2) = \underline{\hspace{2cm}}$ [4]

$f(x) = 6x^3 - 17x^2 - 26x - 8$

[a] $f(4) = \underline{\hspace{2cm}}$

[b] $f\left(-\frac{1}{2}\right) = \underline{\hspace{2cm}}$

[c] $f\left(-\frac{2}{3}\right) = \underline{\hspace{2cm}}$

[24-10] Determine the possible rational zeros of each function.

[24] $f(x) = x^3 - 4x^2 - 11x + 30$

[25] $g(x) = x^4 + 2x^3 + 8x + 16$

[26] $f(x) = 2x^4 + 2x^3 + 8x + 9$

[27] $h(x) = 4x^4 + 2x^3 + 8x + 5$

[28] $p(x) = 5x^5 - x + 6$

[29] $q(x) = 6x^5 + 4x - 3$

[30] If $x = 3$ is a zero of $f(x)$, then _____ is a factor of $f(x)$.

[31] If $x = -4$ is a zero of $g(x)$, then _____ is a factor of $g(x)$.

[32] $f(x) = x^3 - 7x - 6$ [a] List the possible rational zeros: _____

[b] Use synthetic substitution to evaluate f for the possible zeros until you find an actual zero.

[c] Factor f completely.

[d] Use the factors to find all the zeros of f . _____

[33] $f(x) = x^3 + x^2 - 21x - 45$ [a] List the possible rational zeros: _____

[b] Use synthetic substitution to evaluate f for the possible zeros until you find an actual zero.

[c] Factor f completely.

[d] Use the factors to find all the zeros of f . _____

[34] $f(x) = x^3 + 17x^2 + 95x + 175$ [a] List the possible rational zeros: _____

[b] Use synthetic substitution to evaluate f for the possible zeros until you find an actual zero.

[c] Factor f completely.

[d] Use the factors to find all the zeros of f . _____

[35] $f(x) = 6x^3 - 37x^2 - 34x - 7$ [a] List the possible rational zeros: _____

[b] Use synthetic substitution to evaluate f for the possible zeros until you find an actual zero.

[c] Factor f completely.

[d] Use the factors to find all the zeros of f . _____

[36] $f(x) = x^4 + 4x^3 - 60x^2 - 256x - 256$ [a] List the possible rational zeros: _____

[b] Use synthetic substitution to evaluate f for the possible zeros until you find an actual zero.

[c] Use synthetic substitution to find a real zero of the cubic remainder.

[d] Factor f completely.

[e] Use the factors to find all the zeros of f . _____

[37] $f(x) = x^4 - 2x^3 - 35x^2 + 72x - 36$ [a] List the possible rational zeros: _____

[b] Use synthetic substitution to evaluate f for the possible zeros until you find an actual zero.

[c] Use synthetic substitution to find a real zero of the cubic remainder.

[d] Factor f completely.

[e] Use the factors to find all the zeros of f . _____

[37] Find all the zeros by factoring: $f(x) = x^4 + 4x^3 + 6x^2 + 4x + 1$

[38] Find all the zeros by factoring: $f(x) = x^4 + 2x^3 - 13x^2 - 14x + 24$

[39] Find all the zeros by factoring: $f(x) = x^5 + 4x^4 - 13x^3 - 52x^2 + 36x + 144$

[40] Find all the zeros by factoring: $f(x) = x^4 - 7x^3 + 13x^2 + 23x - 78$

[41] Find all the zeros by factoring: $f(x) = x^4 + 10x^3 + 22x^2 - 40x - 104$

[42] Find all the zeros by factoring: $f(x) = x^6 + 7x^3 - 8$