

# Ch. 3 Test Review 2

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Use synthetic division to divide the polynomial.

1.  $\frac{x^3 + 5x^2 + 7}{x + 1}$

2.  $\frac{x^4 + 3x^2 + 29x - 21}{x + 3}$

Use long division to divide the polynomial.

3.  $\frac{2x^3 - 5x^2 - 11x - 17}{x - 4}$

4.  $\frac{3x^3 - x^2 - 7x + 27}{x - 1}$

Use synthetic division to determine whether the binomial is a factor of  $P(x)$ .

5.  $P(x) = x^3 - 6x^2 + 3x + 10$ ;  $x + 2$

6.  $P(x) = x^3 - 3x^2 - 13x + 15$ ;  $x - 5$

Determine the far-left and the far-right behavior of the graph of the function.

7.  $P(x) = 4x^3 - x^2 + 18x - 3$

8.  $P(x) = x^4 - 7x^2 + 5x - 5$

Find all relative and absolute extreme values. Round the nearest hundredth.

9.  $P(x) = 4x^3 - 16x^2 - 9x + 36$

10.  $P(x) = 4x^4 + 40x^3 - 97x^2 - 10x + 24$

Use the Rational Zero Theorem to list possible rational zeros for each polynomial function.

11.  $P(x) = 3x^3 + 5x^2 - 7x + 10$

12.  $P(x) = 4x^3 - 2x^2 + 3x - 8$

Use Descartes' Rule of Signs to state the number of possible positive and negative real zeros of each polynomial function.

13.  $P(x) = 2x^4 - 9x^3 + 4x^2 + 21x - 18$

14.  $P(x) = 7x^4 + 6x^3 - 49x^2 + 36$

**Find the zeros of the polynomial function.**

15.  $P(x) = 2x^4 + 3x^3 - 9x^2 - 15x - 5$

16.  $P(x) = 3x^4 - 5x^3 + 14x^2 - 20x + 8$

**Find the zeros of the polynomial function and write as a product of its leading coefficient and its linear factors.**

17.  $P(x) = 2x^5 - x^4 - 3x^3 + 4x^2 - 14x + 12$

18.  $P(x) = x^4 + 2x^3 - 5x^2 - 4x + 6$

Use the given zero to find the remaining zeros of each polynomial function.

19.  $P(x) = x^4 - 6x^3 + 71x^2 - 146x + 530$ ;  $1 + 3i$

20.  $P(x) = x^4 - 8x^3 + 18x^2 - 8x + 17$ ;  $4 + i$

Determine the vertical and horizontal asymptotes of each rational function.

21.  $f(x) = \frac{-3x}{x^2 - 6x + 9}$

22.  $h(x) = \frac{x^2 + 3x}{x^2 - 2x - 3}$

23.  $f(x) = \frac{x^3 - 6x^2 + 9x}{x^2 - 4}$

Find the slant asymptote of each rational function.

24.  $f(x) = \frac{x^3 - 2x^2 - 4x + 8}{x^2 + 2x - 3}$

25.  $g(x) = \frac{x^3 + 4x^2 + 4x}{x^2 - 1}$

**Find the polynomial function  $P$ , with real coefficients, that has the indicated zeros and satisfies the given conditions.**

26. Zeros:  $-3, 1+i$  Degree: 3

27. Zeros:  $-1, 2, -4i$  Degree: 4

28. Zeros:  $2-i, 3+2i$  Degree: 4

29. Zeros:  $i, 3+i$  Degree: 4