

3.1-3.3 Quiz Review

Use long division to divide the polynomial.

1. $\frac{2x^2 - 9x - 5}{x - 5}$

$2x + 1$

2. $\frac{4x^2 - 10x + 6}{4x + 2}$

$x - 3 + \frac{12}{4x + 2}$

3. $\frac{2x^3 + 3x^2 - 4x + 15}{x + 3}$

$2x^2 - 3x + 5$

Use synthetic division to find the quotient.

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

$3x^2 - 11x + 34 + \frac{-106}{x + 3}$

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

$x^2 - 2x + 1$

6. $(4x^3 - 5x^2 + 13) \div (x + 4)$

$4x^2 - 21x + 84 + \frac{-323}{x + 4}$

Use synthetic division to determine whether the first expression is a factor of the polynomial.

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

No

8. $P(x) = 3x^4 - 6x^3 - 5x + 10, x - 2$

Yes

9. $P(x) = 2x^4 - x^3 + 2x - 1, x - \frac{1}{2}$

Yes

Examine the leading term to determine the far-left and far-right behavior of the graph of each polynomial function.

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

Down Left, Up Right

11. $P(x) = -7x^4 - 3x^3 - x + 6$

Down Left, Down Right

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

Up Left, Down Right

Find all relative and absolute extreme values.

13. $P(x) = 2x^3 + x^2 - 7x - 6$

Max = 0.39

Min = -10.03

14. $P(x) = x^4 + 2x^3 - 9x^2 - 2x + 8$

Min = -39.86

Max = 8

15. $P(x) = 4x^3 - 3x + 1$

Max = 1.99

Min = 0.07

Find the zeros of each polynomial function. If a zero is a multiple zero, state it a multiplicity.

16. $P(x) = x^3 - 8x^2 + 25x - 26$

$2, 3 \pm 2i$

17. $P(x) = 2x^3 - 3x^2 + 32x + 17$

$-\frac{1}{2}, 1 \pm 4i$

18. $P(x) = 4x^4 + 4x^3 - 25x^2 - x + 6$

$2, -3, \pm \frac{1}{2}$

19. $P(x) = x^4 + 2x^3 - 4x^2 - 10x - 5$

-1 (mult 2), $\pm i\sqrt{5}$

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

20. $P(x) = 3x^4 - 5x^3 - 8x^2 - x + 12$

$\pm 1 \pm 2 \pm 3 \pm 4 \pm 6 \pm 12 \pm \frac{1}{3} \pm \frac{2}{3} \pm \frac{4}{3}$

21. $P(x) = 2x^4 + 4x^3 - 10x^2 - x + 10$

$\pm 1 \pm 2 \pm 5 \pm 10 \pm \frac{1}{2} \pm \frac{5}{2}$

Find the smallest positive integer that is the upper bound and the largest negative integer that is a lower bound of the real zeros of each polynomial.

22. $P(x) = x^3 - 3x^2 + 6x - 12$

Upper 3, Lower 1

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

Upper 2, Lower -4

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

24. $P(x) = 3x^3 + 10x^2 - 6x - 8$

$3+, 2-, 0i$
 $1+, 0-, 2i$

25. $P(x) = 5x^4 - 7x^3 - 11x^2 + 12x - 3$

$3+, 1-, 0i$
 $1+, 1-, 2i$

Find the zeros of each polynomial function. If a zero is a multiple zero, state it a multiplicity.

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

$1, -2, -\frac{1}{3}$

27. $P(x) = 4x^4 - 4x^3 - 19x^2 - 14x - 3$

$-1, 3, -\frac{1}{2}$ (mult 2)