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5-5 Practice (continued)

Find all rational roots for $P(x) = 0$.

23. $P(x) = x^3 - 5x^2 + 2x + 8$

24. $P(x) = x^3 + x^2 - 17x + 15$

25. $P(x) = 2x^3 + 13x^2 + 17x - 12$

26. $P(x) = x^3 - x^2 - 34x - 56$

27. $P(x) = x^3 - 18x + 27$

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

29. $P(x) = x^3 - 6x^2 + 13x - 10$

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

31. $P(x) = x^3 - 5x^2 + 17x - 13$

32. $P(x) = x^3 + x + 10$

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

34. $P(x) = x^3 - 12x + 16$

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

36. $P(x) = x^3 - 8x^2 - 200$

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

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

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

40. $P(x) = 12x^3 + 31x^2 - 17x - 6$

Write a polynomial function $P(x)$ with rational coefficients so that $P(x) = 0$ has the given roots.

41. $\sqrt{3}, 2, -i$

42. $5, 2i$

43. $-1, 3 + I$

44. $-\sqrt{7}, i$

45. $-4, 4i$

46. $6, 3 - 2i$

47. Error Analysis A student claims that $2i$ is the only imaginary root of a polynomial equation that has real coefficients. Explain the student's mistake.

48. You are building a rectangular sandbox for a children's playground. The width of the sandbox is 4 times its height. The length of the sandbox is 8 ft more than 2 times its height. You have 40 ft^3 of sand available to fill this sandbox. What are the dimensions of the sandbox?

49. Writing According to the Rational Root Theorem, what is the relationship between the polynomial equation $2x^4 - x^3 - 7x^2 + 5x + 3 = 0$ and rational roots of the form $\frac{p}{q}$, where $\frac{p}{q}$ is in simplest form?

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5-5 Practice

Use the Rational Root Theorem to list all possible rational roots for each equation. Then find any actual rational roots.

1. $x^3 + 5x^2 - 2x - 15 = 0$

2. $36x^3 + 144x^2 - x - 4 = 0$

3. $2x^3 + 5x^2 + 4x + 1 = 0$

4. $12x^4 + 14x^3 - 5x^2 - 14x - 4 = 0$

5. $5x^3 - 11x^2 + 7x - 1 = 0$

6. $x^3 + 81x^2 - 49x - 49 = 0$

A polynomial function $P(x)$ with rational coefficients has the given roots. Find two additional roots of $P(x) = 0$.

7. $2 + 3i$ and $\sqrt{7}$

8. $3 - \sqrt{2}$ and $1 + \sqrt{3}$

9. $-4i$ and $6 - i$

10. $5 - \sqrt{6}$ and $-2 + \sqrt{10}$

11. $\sqrt{5}$ and $-\sqrt{13}$

12. $1 - \sqrt{10}$ and $2 + \sqrt{2}$

Write a polynomial function with rational coefficients so that $P(x) = 0$ has the given roots.

13. 4 and 6

14. -5 and -1

15. $3i$ and $\sqrt{6}$

16. $2 + i$ and $1 - \sqrt{5}$

17. -5 and $3i$

18. i and $5i$

What does Descartes' Rule of Signs say about the number of positive real roots and negative real roots for each polynomial function?

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

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

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

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

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5-6 Practice

Without using a calculator, find all the complex roots of each equation.

1. $x^5 - 3x^4 - 8x^3 - 8x^2 - 9x - 5 = 0$

2. $x^3 - 2x^2 + 4x - 8 = 0$

3. $x^3 + x^2 - x + 2 = 0$

4. $x^4 - 2x^3 - x^2 - 4x - 6 = 0$

5. $x^4 + 3x^3 - 21x^2 - 48x + 80 = 0$

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

Find all the zeros of each function.

7. $y = 5x^3 - 5x$

8. $f(x) = x^3 - 16x$

9. $g(x) = 12x^3 - 2x^2 - 2x$

10. $y = 6x^3 + x^2 - x$

11. $f(x) = 5x^3 + 6x^2 + x$

12. $y = -4x^3 + 100x$

For each equation, state the number of complex roots, the possible number of real roots, and the possible rational roots.

13. $2x^2 + 5x + 3 = 0$

14. $3x^2 + 11x - 10 = 0$

15. $2x^4 - 18x^2 + 5 = 0$

16. $4x^3 - 12x + 9 = 0$

17. $6x^5 - 28x + 15 = 0$

18. $x^3 - x^2 - 2x + 7 = 0$

19. $x^3 - 6x^2 - 7x - 12 = 0$

20. $2x^4 + x^2 - x + 6 = 0$

21. $4x^5 - 5x^4 + x^3 - 2x^2 + 2x - 6 = 0$

22. $7x^6 + 3x^4 - 9x^2 + 18 = 0$

23. $5 + x + x^2 + x^3 + x^4 + x^5 = 0$

24. $6 - x + 2x^3 - x^3 + x^4 - 8x^5 = 0$

Find the number of complex roots for each equation.

25. $x^8 - 5x^6 + x^4 + 2x - 16 = 0$

26. $x^{10} - 100 = 0$

27. $2x^4 + x^3 - 3x^2 + 4x - 2 = 0$

28. $-4x^3 + x^2 - 3x + 10 = 0$

29. $x^6 + 2x^5 + 3x^4 + 4x^3 + 5x^2 + 6x + 10 = 0$

30. $-3x^5 + 4x^4 + 5x^2 - 15 = 0$

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5-6 Practice (continued)

Find all the zeros of each function.

31. $f(x) = x^3 - 9x^2 + 27x - 27$

32. $y = 2x^3 - 8x^2 + 18x - 72$

33. $y = x^3 - 10x - 12$

34. $y = x^3 - 4x^2 + 8$

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

36. $y = x^3 - 2x^2 - 11x + 12$

37. $g(x) = x^3 + 4x^2 + 7x + 28$

38. $f(x) = x^3 + 3x^2 + 6x + 4$

39. $g(x) = x^4 - 5x^2 - 36$

40. $y = x^4 - 7x^2 + 12$

41. $y = 9x^4 + 5x^2 - 4$

42. $y = 4x^4 - 11x^2 - 3$

43. Error Analysis Your friend says that the equation $4x^7 - 3x^3 + 4x^2 - x + 2 = 0$ has 5 complex roots. You say that the equation has 7 complex roots. Who is correct? What mistake was made?

44. A section of roller coaster can be modeled by the function $f(x) = x^5 - 5x^4 - 31x^3 + 113x^2 + 282x - 360$. A walkway bridge will be placed at one of the zeros. What are the possible locations for the walkway bridge?

45. Writing Using the Fundamental Theorem of Algebra, explain how $x^3 = 0$ has 3 roots and 3 linear factors.

46. How many complex roots does the equation $x^4 = 256$ have? What are they?

47. Reasoning Can a fifth-degree polynomial with rational coefficients have 4 real roots and 1 irrational root? Explain why or why not?

5.6 Practice Questions

Submit Assignment

Due Thursday by 11:59pm **Points** 44
Submitting a text entry box or a file upload
Available Mar 3 at 12am - Mar 25 at 11:59pm 23 days

5.6 Practice Questions Fillable.pdf

You must select submit assignment in order to see the text entry box, or the upload file section to send in your answers.

To Answer Questions and Submit

1) Type in your answers in the boxes provided. If possible try and workout the problem in the text box given.

2) Save the PDF to your computer (so you have a copy).

3A) If there is a graph/drawing that needs to be completed, open the saved PDF in Adobe Acrobat Reader, click the comment button on the right hand side, then click the pen icon. This will allow you to draw. (do the best you can!)

3B) If you do not need to graph/draw anything, then simply upload your saved file in the space provided.

4) If you did have to graph/draw, then make sure you saved your file once more before uploading it for submission.