



4.2 Solving Rational Exponents, Specified Variable, And “U” Substitution

SCORE:

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2023-2024

Name _____ Date _____ Period _____

Solve each rational exponent equation. **SHOW WORK!** (no work = no credit). Make sure you check for extraneous answers.

1. $2(x+3)^{\frac{2}{3}} = 8$

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

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

4. $(2x)^{\frac{1}{2}} = (x+5)^{\frac{1}{2}}$

5. $(x-4)^{\frac{2}{3}} = 5$

6. $3(x-2)^{\frac{3}{4}} = 24$

7. $2(x-1)^{\frac{4}{3}} + 4 = 36$

8. $2(2x)^{\frac{1}{3}} + 1 = 5$

Solve for the specified variable.

9. $y = 5x - 6$ (solve for x)

10. $7x - y = 14$ (solve for x)

11. $x + 7y = 8x + 14$ (solve for y)

12. $P = \frac{R - C}{N}$ (solve for R)

13. $y = \frac{xz}{6}$ (solve for z)

14. $\frac{cx}{d} + f = b$ (solve for x)

15. $\sqrt{b^2 - 4ac} = k$ (solve for c)

16. $\sqrt{b^2 - 4ac} = k$ (solve for b)

17. $y = \frac{x - 4}{x + 1}$ (solve for x)

18. $y = \frac{x + 2}{x - 6}$ (solve for x)

Solve each equation by factoring using substitution. Leave answers as exact solutions, no rounding.

19. $x^4 + 4x^2 - 21 = 0$

20. $3x^{10} + 11x^5 = -8$

21. $(x + 3)^2 - 2(x + 3) - 24 = 0$

22. $3(2 - x)^2 + 5(2 - x) + 2 = 0$

23. $x^{\frac{2}{3}} + 9x^{\frac{1}{3}} + 20 = 0$

24. $x^{\frac{4}{3}} - 6x^{\frac{2}{3}} + 9 = 0$

25. $x - 3\sqrt{x} - 4 = 0$

26. $5x - 8\sqrt{x} = 4$

27. How long does it take for a ball to hit the ground when it is dropped from a roof that is 25 feet above the ground? Use the formula $f(t) = -16t^2 + h_0$, where h_0 is the initial height, $f(t)$ is the final height, and t is the time in seconds.

28. You want to carpet a square room that is 144 square feet. How long is the side of the room? Use the area formula of a square.

Review Exercises

Solve

29. $x^2 - 4 = 0$

30. $-4\sqrt{5x + 2} - 3 = -19$

31. $\frac{x}{x+3} = 8$

32. $3|2x - 12| - 1 = 8$