Your Name

Mrs. Theo

4/12/21

9.3

Solving Quadratic Equations with the Square Root

Notes

Solving Binomial Equations

1. move the constant term to the other side
2. undo the multiplication the variable term has
3. undo the exponent with the root
4. Even Roots create two answers + and -

$x^2 = 4$
$(2)^2 = 4$
$(-2)^2 = 4$

ex. $2x^2 - 8 = 0$

$+8 \quad +8$

$\frac{2x^2}{2} = \frac{8}{2}$

$\sqrt{x^2} = \sqrt{4}$

$x = \pm 2$

$x = 2$ and $x = -2$

ex. $3x^2 - 27 = 0$

$+27 \quad +27$

$\frac{3x^2}{3} = \frac{27}{3}$

$\sqrt{x^2} = \sqrt{9}$

$x = \pm 3$

ex. $x^2 + 8 = 0$

$-8 \quad -8$

$\sqrt{x^2} = \sqrt{-8}$

Imaginary solution can't take $\sqrt{\text{neg. \#}}$

ex. $-x^3 - 59 = 5$

$+59 \quad +59$

$\frac{-x^3}{-1} = \frac{64}{-1}$

$\sqrt[3]{x^3} = \sqrt[3]{64}$

$x = \sqrt[3]{4 \cdot 4 \cdot 4}$

$x = 4$

one solution

ex. $x^2 - 12 = 4$

$+12 \quad +12$

$\sqrt{x^2} = \sqrt{16}$

$x = 4$

$x = -4$

ex. $-4x^2 + 81 = 0$

$-81 \quad -81$

$\frac{-4x^2}{-4} = \frac{-81}{-4}$

$\sqrt{x^2} = \sqrt{\frac{81}{4}}$

$x = \pm \frac{9}{2}$

Homework: Pick 4 from 3-8 and 9-16

Pick 2 from 19-24 and 25-29

In Exercises 3–8, determine the number of real solutions of the equation. Then solve the equation using square roots.

3. $x^2 = 25$
4. $x^2 = -36$
5. $x^2 = -21$
6. $x^2 = 400$
7. $x^2 = 0$
8. $x^2 = 169$

In Exercises 9–18, solve the equation using square root *(See Example 1.)*

9. $x^2 - 16 = 0$
10. $x^2 + 6 = 0$
11. $3x^2 + 12 = 0$
12. $x^2 - 55 = 26$
13. $2x^2 - 98 = 0$
14. $-x^2 + 9 = 9$
15. $-3x^2 - 5 = -5$
16. $4x^2 - 371 = 29$
17. $4x^2 + 10 = 11$
18. $9x^2 - 35 = 14$

In Exercises 19–24, solve the equation using square roots. *(See Example 2.)*

19. $(x + 3)^2 = 0$
20. $(x - 1)^2 = 4$
21. $(2x - 1)^2 = 81$
22. $(4x + 5)^2 = 9$
23. $9(x + 1)^2 = 16$
24. $4(x - 2)^2 = 25$

In Exercises 25–30, solve the equation using square roots. Round your solutions to the nearest hundredth. *(See Example 3.)*

25. $x^2 + 6 = 13$
26. $x^2 + 11 = 24$
27. $2x^2 - 9 = 11$
28. $5x^2 + 2 = 6$

3. 2; $x = 5, x = -5$
4. 0; no real solutions
5. 0; no real solutions
6. 2; $x = 20, x = -20$
7. 1; $x = 0$
8. 2; $x = 13, x = -13$
9. $x = 4, x = -4$
10. no real solutions
11. no real solutions
12. $x = 9, x = -9$
13. $x = 7, x = -7$
14. $x = 0$
15. $x = 0$
16. $x = 10, x = -10$
17. $x = \frac{1}{2}, x = -\frac{1}{2}$
18. $x = \frac{7}{3}, x = -\frac{7}{3}$
19. $x = -3$
20. $x = 3, x = -1$
21. $x = 5, x = -4$
22. $x = -\frac{1}{2}, x = -2$
23. $x = \frac{1}{3}, x = -\frac{7}{3}$
24. $x = \frac{9}{2}, x = -\frac{1}{2}$
25. $x \approx 2.65, x \approx -2.65$
26. $x \approx 3.61, x \approx -3.61$
27. $x \approx 3.16, x \approx -3.16$
28. $x \approx 0.89, x \approx -0.89$
29. $x \approx 4.24, x \approx -4.24$
30. $x \approx 1.32, x \approx -1.32$