
Simplify each expression. Give exact answers—*no decimals*.

1. $\sqrt{28}$

2. $\sqrt{-3}$

3. $\sqrt{-120}$

4. $3\sqrt{20}$

5. $5\sqrt{-18}$

6. $2\sqrt{-48}$

7. $\sqrt{6} \cdot \sqrt{27}$

8. $5\sqrt{10} \cdot 3\sqrt{24}$

9. $\sqrt{\frac{5}{9}}$

10. $\sqrt{\frac{23}{49}}$

11. $\frac{3}{\sqrt{5}}$

12. $\frac{5}{\sqrt{8}}$

13. $\sqrt{\frac{18}{7}}$

14. $\sqrt{\frac{11}{28}}$

15. $\frac{1}{5-\sqrt{6}}$

16. $\frac{3}{1+\sqrt{2}}$

17. $\frac{\sqrt{2}}{3-\sqrt{5}}$

18. $\frac{\sqrt{3}}{2+\sqrt{7}}$

Solve each equation. Give exact answers—no decimals.

19. $x^2 = 50$

20. $x^2 = 84$

21. $x^2 - 81 = 0$

22. $x^2 - 11 = 16$

23. $6z^2 = 150$

24. $x^2 - 8 = -36$

25. $3x^2 - 7 = -31$

26. $5x^2 + 33 = 3$

27. $9 - 4y^2 = 57$

28. $5x^2 - 10 = 25$

29. $5x^2 + 3 = 2x^2 + 9$

30. $6x^2 - 20 = 9x^2 + 4$

31. $\frac{x^2}{5} - 8 = 2$

32. $5(x-1)^2 = 10$

33. $2(n-2)^2 - 5 = 9$

34. $-5(x-7)^2 = 10$

35. $3(n+5)^2 + 7 = -17$

36. $-2(x+4)^2 - 11 = 45$

37. When an object is dropped, its height h (in feet) above the ground after t seconds can be modeled by the function $h = -16t^2 + h_0$ where h_0 is the object's initial height (in feet). (This model works only on earth and assumes that the force of air resistance on the object is negligible.) Find the time it takes for a rock dropped from each of the following heights to hit the ground.

a. 50 feet

b. 125 feet

c. 200 feet

38. Parachute jumpers are in a free fall from the time they jump out of a plane until they open their parachutes. The function $h = -16t^2 + 1576$ models a jumper's height h (in feet) at t seconds for a jump from 1576 feet.

a. Using square roots, find the time during which the jumper is in free fall if the parachute opens at 1000 feet.

b. Using factoring, find the time during which the jumper is in free fall if the parachute opens at 1000 feet.

c. Which method do you prefer?

Each of the formulas below contains a variable that is squared. Solve each formula for the indicated variable.

39. Area of a square with side length s

$$A = s^2; \text{ solve for } s$$

40. Volume of a cylinder with radius r

$$V = \pi r^2 h; \text{ solve for } r$$

41. Volume of a cone with radius r .

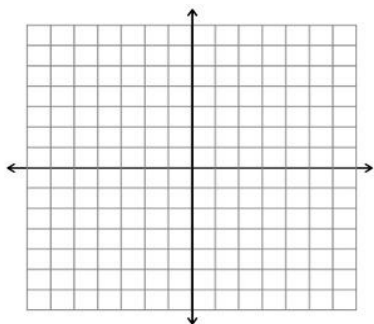
$$V = \frac{1}{3} \pi r^2 h; \text{ solve for } r$$

42. Pythagorean Theroem

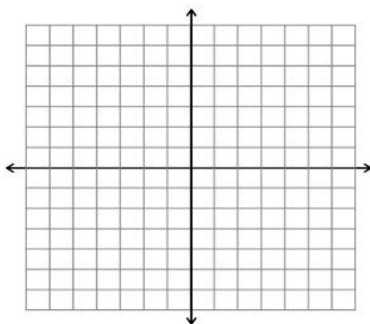
$$a^2 + b^2 = c^2; \text{ solve for } b$$

Review: Graph each quadratic function. Label the vertex and one other point. State the domain and range.

43. $f(x) = -3(x - 2)^2 + 5$



44. $y = \frac{1}{2}x^2 - 3$



45. $g(x) = 3x^2 - 6x + 7$

