

6-7: Solving Radical Equations and Inequalities (Practice)

Solve each equation.

1. $(\sqrt{x})^2 = 8$

$x = 64$

2. $4 - \sqrt{x} = 3$

$$\begin{aligned} -4 & -4 \\ -\sqrt{x} & = -1 \\ (\sqrt{x})^2 & = (1)^2 \end{aligned}$$

$x = 1$

3. $\sqrt{2p+3} = 10$

$$\begin{aligned} -3 & -3 \\ (\sqrt{2p})^2 & = (7)^2 \end{aligned}$$

$2p = 49$

$p = \frac{49}{2}$

4. $4\sqrt{3h} - 2 = 0$

$$\begin{aligned} +2 & +2 \\ 4\sqrt{3h} & = 2 \\ \frac{4\sqrt{3h}}{4} & = \frac{2}{4} \end{aligned}$$

$(\sqrt{3h})^2 = \left(\frac{1}{2}\right)^2$

$3h = \frac{1}{4} \div 3$

$h = \frac{1}{12}$

5. $c^{\frac{1}{2}} + 6 = 9$

$$\begin{aligned} -6 & -6 \\ (c^{\frac{1}{2}})^2 & = (3)^2 \\ c & = 9 \end{aligned}$$

6. $18 + 7h^{\frac{1}{2}} = 12$

$$\begin{aligned} -18 & -18 \\ 7h^{\frac{1}{2}} & = -6 \\ h^{\frac{1}{2}} & = -\frac{6}{7} \end{aligned}$$

 $\sqrt{h} = -\frac{6}{7}$
no real solution!

7. $6 + \sqrt[3]{q-4} = 9$

$$\begin{aligned} -6 & -6 \\ (\sqrt[3]{q-4})^3 & = 3^3 \\ q-4 & = 27 \\ +4 & +4 \end{aligned}$$

$q = 31$

8. $4\sqrt{y-9} + 4 = 0$

$$\begin{aligned} -4 & -4 \\ 4\sqrt{y-9} & = -4 \end{aligned}$$

even index root \neq neg #

no real solution!

9. $\sqrt{2m-6} - 16 = 0$

$$\begin{aligned} +16 & +16 \\ (\sqrt{2m-6})^2 & = (16)^2 \\ 2m-6 & = 256 \\ +6 & +6 \end{aligned}$$

$2m = 262$

$m = 131$

10. $\sqrt[3]{4m+1} - 2 = 2$

$$\begin{aligned} +2 & +2 \\ (\sqrt[3]{4m+1})^3 & = 4^3 \end{aligned}$$

$4m+1 = 64$

$4m = 63$

$m = \frac{63}{4}$

11. $\sqrt{8n-5} - 1 = 2$

$$\begin{aligned} +1 & +1 \\ (\sqrt{8n-5})^2 & = 3^2 \\ 8n-5 & = 9 \\ +5 & +5 \end{aligned}$$

$8n = 14$

$n = \frac{7}{4}$

6-7: Solving Radical Equations and Inequalities (Practice)

$$12. \sqrt{1-4t} - 8 = -6$$

$$+8 \quad +8$$

$$(\sqrt{1-4t})^2 = 2^2$$

$$1-4t = 4$$

$$-1 \quad -1$$

$$-4t = 3$$

$$t = -3/4$$

$$13. (7v-2)^{1/4} + 12 = 7$$

$$-12 \quad -12$$

$$(7v-2)^{1/4} = -5$$

even index root \neq neg #

no real solution

$$14. (3g+1)^{1/2} - 6 = 4$$

$$+6 \quad +6$$

$$[(3g+1)^{1/2}]^2 = 10^2$$

$$3g+1 = 100$$

$$3g = 99$$

$$g = 33$$

$$15. (\sqrt{6x-4})^2 = (\sqrt{2x+10})^2$$

$$6x-4 = 2x+10$$

$$4x = 14$$

$$x = 7/2$$

$$16. (\sqrt{2x+5})^2 = (\sqrt{2x+1})^2$$

$$2x+5 = 2x+1$$

$$5 \neq 1$$

no solution

Solve each inequality.

$$17. \sqrt[3]{a} \geq 12$$

$$\frac{1}{3} \quad \frac{1}{3}$$

$$\textcircled{1} a \geq 0$$

$$\textcircled{2} (\sqrt[3]{a})^3 \geq 12^3$$

$$a \geq 1728$$

$$a \geq 1728$$

$$[1728, \infty)$$

$$18. \sqrt{z+5} + 4 \leq 13$$

$$-4 \quad -4$$

$$\textcircled{1} z+5 \geq 0$$

$$z \geq -5$$

$$\textcircled{2} \sqrt{z+5} \leq 9$$

$$z+5 \leq 81$$

$$z \leq 76$$

$$19. 8 + \sqrt{2q} \leq 5$$

$$\textcircled{19} 8 + \sqrt{2q} \leq 5$$

$$\sqrt{2q} \leq -3$$

no solution!