

Solve each equation. Check for extraneous solutions.

1. $(4x-3)^{3/2} = (8)^{2/3}$

$$\begin{array}{r} 4x-3 = 4 \\ +3 \quad +3 \\ \hline 4x = 7 \\ \frac{4x}{4} = \frac{7}{4} \end{array}$$

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

or $x = 1.75$

2. $-\frac{2}{3} + \sqrt{7x+2} = x$ 2 and 1

$$\begin{aligned} (\sqrt{7x+2})^2 &= (x+2)^2 \\ 7x+2 &= (x+2)(x+2) \\ 7x+2 &= x^2+4x+4 \\ -x-2 & \quad \quad \quad -7x-2 \\ \hline 0 &= x^2-3x+2 \\ 0 &= (x-2)(x-1) \end{aligned}$$

3. $\sqrt{5x+1} - \sqrt{4x+3} = 0$

$$\begin{aligned} (\sqrt{5x+1})^2 &= (\sqrt{4x+3})^2 \\ 5x+1 &= 4x+3 \\ -4x & \quad \quad \quad -4x \\ \hline x+1 &= 3 \\ -1 & \quad \quad \quad -1 \\ \hline x &= 2 \end{aligned}$$

4. $5\sqrt{x+1} - 6 = 24$

$$\frac{5\sqrt{x+1}}{5} = \frac{30}{5}$$

$$(\sqrt{x+1})^2 = (6)^2$$

$$\begin{array}{r} x+1 = 36 \\ -1 \quad -1 \\ \hline x = 35 \end{array}$$

$x = 35$

5. $(\sqrt{x-8})(\sqrt{5x-64})^2$

$$\begin{aligned} x-8 &= 5x-64 \\ -x & \quad \quad \quad -x \\ \hline -8 &= 4x-64 \\ +64 & \quad \quad \quad +64 \\ \hline 56 &= 4x \\ \frac{56}{4} &= \frac{4x}{4} \\ x &= 14 \end{aligned}$$

$x = 14$

6. $-\frac{8\sqrt[3]{x}}{-8} = \frac{-72}{-8}$

$$(\sqrt[3]{x})^3 = (9)^3$$

$x = 729$

7. $(\sqrt{9x+10})^2 = (x)^2$

$$\begin{array}{r} 9x+10 = x^2 \\ -9x-10 \quad -9x-10 \\ \hline 0 = x^2-9x-10 \end{array}$$

$$\begin{aligned} 0 &= x^2-9x-10 \\ 0 &= (x-10)(x+1) \end{aligned}$$

10 and x

8. $\frac{7(x-1)^3}{7} = \frac{567}{7}$

$((x-1)^{4/3})^{3/4} = (81)^{3/4}$

$$\begin{array}{r} x-1 = \pm 27 \\ +1 \quad +1 \end{array}$$

$x = 28$ and -26

9. $(2x-1)^{5/4} + 3 = 35$

$$\begin{aligned} (2x-1)^{5/4} &= 32 \\ ((2x-1)^{5/4})^{4/5} &= (32)^{4/5} \end{aligned}$$

$$\begin{array}{r} 2x-1 = 16 \\ +1 \quad +1 \end{array}$$

$$\frac{2x}{2} = \frac{17}{2}$$

$x = 8.5$

10. A spherical water tank holds 15,000 ft³ of water. Find the diameter of the tank. (Hint $V = \frac{\pi}{6}d^3$).

$$\frac{6}{\pi} \cdot 15000 = \frac{\pi}{6} d^3 \quad \frac{6}{\pi} \cdot 15000 = \frac{\pi}{6} d^3 \quad \sqrt[3]{28647.89} = \sqrt[3]{d^3}$$

$$28647.89 = d^3$$

$30.6 = d$
ft

11. The volume of a sphere is $\frac{4}{3}\pi r^3 = V$, where V is the volume of the sphere and r is the radius of the sphere. What is the radius of a sphere with a volume of 160 in³?

$$\frac{3}{4} \cdot \frac{4}{3} \pi r^3 = 160 \cdot \frac{3}{4}$$

$$\frac{\pi r^3}{\pi} = \frac{120}{\pi}$$

$$r^3 = 38.197$$

$$\sqrt[3]{r^3} = \sqrt[3]{38.197}$$

$r = 3.4$ in

Graph. Find the domain and range of each function.

12. $y = 2\sqrt{x-1} + 2$

Domain $x \geq 1$

Range $y \geq 2$

$y = 2\sqrt{x}$

x	y
0	0
1	2
4	4
9	6

Describe the horizontal shift

right 1

Describe the vertical shift

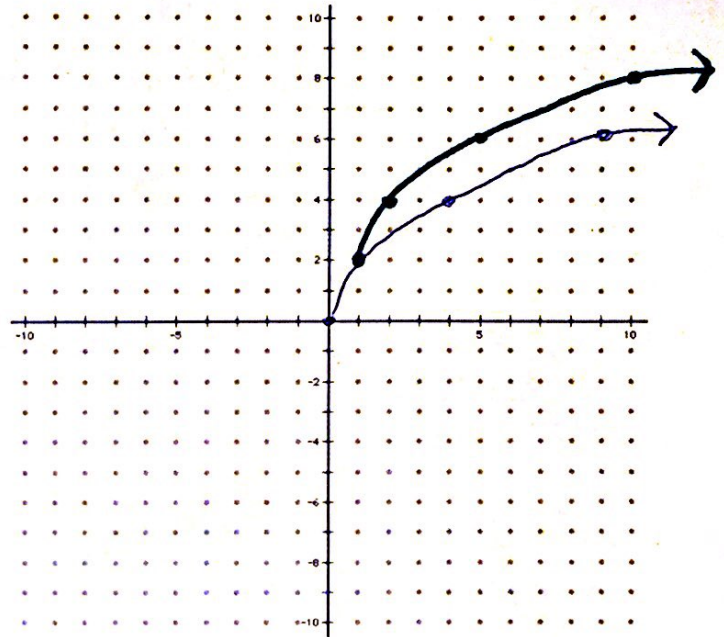
up 2

Is there a vertical stretch, shrink, or neither?

stretch

Reflection over the x-axis? Yes or no

no



13. $y = -\sqrt[3]{x+1} - 3$

Domain all real #'s

Range all real #'s

$y = -\sqrt[3]{x}$

x	y
-8	2
-1	1
0	0
1	-1
8	-2

Describe the horizontal shift

left 1

Describe the vertical shift

down 3

Is there a vertical stretch, shrink, or neither?

neither

Reflection over the x-axis? Yes or no

yes

