

Review Exercise Set 20

Exercise 1: Solve the following equation for the unknown variable.

$$\sqrt{x+13} = 4$$

Exercise 2: Solve the following equation for the unknown variable.

$$\sqrt{7y-5} = 3$$

Exercise 3: Solve the following equation for the unknown variable.

$$\sqrt{3x+1} = \sqrt{x+4}$$

Exercise 4: Solve the following equation for the unknown variable.

$$4\sqrt{x} + 5 = x$$

Exercise 5: Solve the following equation for the unknown variable.

$$\sqrt{2x-1} - \sqrt{x+3} = 1$$

Review Exercise Set 20 Answer Key

Exercise 1: Solve the following equation for the unknown variable.

$$\begin{aligned}\sqrt{x+13} &= 4 \\ (\sqrt{x+13})^2 &= (4)^2 \\ x+13 &= 16 \\ x &= 3\end{aligned}$$

Check:

$$\begin{aligned}\sqrt{x+13} &= 4 \\ \sqrt{3+13} &= 4 \\ \sqrt{16} &= 4 \\ 4 &= 4\end{aligned}$$

x = 3 is the solution

Exercise 2: Solve the following equation for the unknown variable.

$$\begin{aligned}\sqrt{7y-5} &= 3 \\ (\sqrt{7y-5})^2 &= (3)^2 \\ 7y-5 &= 9 \\ 7y &= 14 \\ y &= 2\end{aligned}$$

Check:

$$\begin{aligned}\sqrt{7y-5} &= 3 \\ \sqrt{7(2)-5} &= 3 \\ \sqrt{14-5} &= 3 \\ \sqrt{9} &= 3 \\ 3 &= 3\end{aligned}$$

y = 2 is the solution

Exercise 3: Solve the following equation for the unknown variable.

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

Check:

$$\begin{aligned}\sqrt{3x+1} &= \sqrt{x+4} \\ \sqrt{3\left(\frac{3}{2}\right)+1} &= \sqrt{\left(\frac{3}{2}\right)+4} \\ \sqrt{\frac{9}{2}+\frac{2}{2}} &= \sqrt{\frac{3}{2}+\frac{8}{2}} \\ \sqrt{\frac{11}{2}} &= \sqrt{\frac{11}{2}}\end{aligned}$$

$x = \frac{3}{2}$ is the solution

Exercise 4: Solve the following equation for the unknown variable.

$$\begin{aligned}4\sqrt{x} + 5 &= x \\ 4\sqrt{x} &= x - 5 \\ (4\sqrt{x})^2 &= (x-5)^2 \\ 16x &= x^2 - 5x - 5x + 25 \\ 16x &= x^2 - 10x + 25 \\ 0 &= x^2 - 26x + 25 \\ 0 &= (x-1)(x-25) \\ x-1 &= 0 \quad \text{or} \quad x-25 = 0 \\ x &= 1 \qquad \qquad x = 25\end{aligned}$$

Exercise 4 (Continued):

Check:

$$x = 1$$

$$x = 25$$

$$4\sqrt{1} + 5 = 1$$

$$4\sqrt{25} + 5 = 25$$

$$4 + 5 = 1$$

$$4(5) + 5 = 25$$

$$9 = 1$$

$$20 + 5 = 25$$

$$25 = 25$$

False

True

x = 25 is the solution

Exercise 5: Solve the following equation for the unknown variable.

$$\sqrt{2x-1} - \sqrt{x+3} = 1$$

$$\sqrt{2x-1} = 1 + \sqrt{x+3}$$

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

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

$$2x-1 = 1 + 2\sqrt{x+3} + x+3$$

$$2x-1 = 2\sqrt{x+3} + x+4$$

$$x-5 = 2\sqrt{x+3}$$

$$(x-5)^2 = (2\sqrt{x+3})^2$$

$$x^2 - 5x - 5x + 25 = 4(x+3)$$

$$x^2 - 10x + 25 = 4x + 12$$

$$x^2 - 14x + 13 = 0$$

$$(x-1)(x-13) = 0$$

$$x-1=0 \quad \text{or} \quad x-13=0$$

$$x=1$$

$$x=13$$

Exercise 5 (Continued):

Check:

$$\sqrt{2x-1}-\sqrt{x+3}=1$$

$$\sqrt{2(1)-1}-\sqrt{1+3}=1$$

$$\sqrt{2-1}-\sqrt{4}=1$$

$$\sqrt{1}-\sqrt{4}=1$$

$$1-2=1$$

$$-1=1$$

False

$$\sqrt{2x-1}-\sqrt{x+3}=1$$

$$\sqrt{2(13)-1}-\sqrt{13+3}=1$$

$$\sqrt{26-1}-\sqrt{16}=1$$

$$\sqrt{25}-\sqrt{16}=1$$

$$5-4=1$$

$$1=1$$

True

x = 13 is the solution