

1. Solve: $\sqrt{2x+1} = x-7$

$$\begin{aligned} (\sqrt{2x+1})^2 &= (x-7)^2 \\ 2x+1 &= x^2 - 14x + 49 \\ 0 &= x^2 - 16x + 48 \\ 0 &= (x-12)(x-4) \\ \downarrow & \qquad \qquad \downarrow \\ x &= 12 \qquad \qquad x = 4 \end{aligned}$$

Check $x=12$:

$$\begin{aligned} \sqrt{2(12)+1} &\stackrel{?}{=} 12-7 \\ \sqrt{25} &= 5 \checkmark \end{aligned}$$

Check $x=4$:

$$\begin{aligned} \sqrt{2(4)+1} &\stackrel{?}{=} 4-7 \\ \sqrt{9} &= -3 \times \end{aligned}$$

$$\boxed{\{12\}}$$

2. Solve: $\sqrt{x-4} + \sqrt{x+4} = 4$

$$\begin{aligned} \sqrt{x-4} &= 4 - \sqrt{x+4} \\ (\sqrt{x-4})^2 &= (4 - \sqrt{x+4})^2 \\ x-4 &= \underline{16} - 8\sqrt{x+4} + \underline{(x+4)} \\ -4 &= 20 - 8\sqrt{x+4} \\ \underline{-20} \quad \underline{-20} & \\ \underline{-24} &= \underline{-8\sqrt{x+4}} \\ \underline{-8} \quad \underline{-8} & \\ (3)^2 &= (\sqrt{x+4})^2 \\ 9 &= x+4 \\ 5 &= x \end{aligned}$$

Check $x=5$:

$$\begin{aligned} \sqrt{5-4} + \sqrt{5+4} &\stackrel{?}{=} 4 \\ \sqrt{1} + \sqrt{9} &\stackrel{?}{=} 4 \\ 1 + 3 &= 4 \checkmark \end{aligned}$$

$$\boxed{\{5\}}$$

3. Solve: $\sqrt[3]{3x-6} + 5 = 8$

$$\sqrt[3]{3x-6} = 3$$

$$\left[\sqrt[3]{3x-6}\right]^3 = (3)^3$$

$$3x-6 = 27$$

$$3x = 33$$

$$x = 11$$

$$\boxed{\{11\}}$$

Q: What are the next two letters in this sequence: A E F H I K L M ?