EXAMPLE 1:

SOLVE $9-2\sqrt{3x+1}=1$.

For your homework, you only need to show

- **the algebra (shown in the rightmost column below),**
- **the check, and**
- **the final answer.**

You do not need to include all the English below.

- **Overview:**
- **First we get the square root on one side by itself.**
- **Then we square both sides to get rid of the square root.**
- **Then we solve the remaining equation using old techniques.**

			SOLUTION SHOWN IN THIS COLUMN ⬇
Starting with			$9-2\sqrt{3x+1}=1$
Subtract 9 from both sides	$9-2\sqrt{3x+1}-9=1-9$	➡	$-2\sqrt{3x+1}=-8$
Divide both sides by –2	$\frac{-2\sqrt{3x+1}}{-2}=\frac{-8}{-2}$	➡	$\sqrt{3x+1}=4$
Square both sides	$(\sqrt{3x+1})^2=(4)^2$	➡	$3x+1=16$

- **At this point, the equation is like other equations we've solved in beginning algebra.**
- **So, we will use old techniques from this point onward.**

Subtract 1 from both sides	$3x+1-1=16-1$	➡	$3x=15$
Divide both sides by 3	$\frac{3x}{3}=\frac{15}{3}$	➡	$x=5$

Check the answer in the **original equation**

$$\begin{aligned} & 9-2\sqrt{3(5)+1} \\ &= 9-2\sqrt{16} \\ x=5: \quad &= 9-2(4) \\ &= 9-8 \\ &= 1 \end{aligned}$$

So, $x=5$ is a solution.

The final answer is $x=5$.

EXAMPLE 2:

SOLVE $\sqrt{x+5}+x=7$.

For your homework, you only need to show

- **the algebra (shown in the rightmost column below),**
- **the check, and**
- **the final answer.**

You do not need to include all the English below.

- **Overview:**
- **First we get the square root on one side by itself.**
- **Then we square both sides to get rid of the square root.**
- **Then we solve the remaining equation using old techniques.**

SOLUTION SHOWN IN THIS COLUMN

Starting with $\sqrt{x+5}+x=7$

Subtract x from both sides $\sqrt{x+5}+x-x=7-x$ ➡ $\sqrt{x+5}=7-x$

Square both sides $(\sqrt{x+5})^2=(7-x)^2$ ➡ $x+5=49-14x+x^2$

- **At this point, the equation is like other equations we've solved in beginning algebra.**
- **So, we will use old techniques from this point onward.**

Subtract $x+5$ from both sides

$x+5-(x+5)=49-14x+x^2-(x+5)$ ➡ $0=x^2-15x+44$

Factor ➡ $0=(x-4)(x-11)$

Since the product of 2 factors is 0, one of the factors must be 0

$x-4=0$ or $x-11=0$ ➡ $x=4$ or $x=11$

Check both answers in the **original equation**

$x=4$:

$$\begin{aligned}&\sqrt{4+5}+4\\&=\sqrt{9}+4\\&=3+4\\&=7\end{aligned}$$

So, $x=4$ is a solution.

$x=11$:

$$\begin{aligned}&\sqrt{11+5}+11\\&=\sqrt{16}+11\\&=4+11\\&=15\end{aligned}$$

So, $x=11$ is not a solution ($x=11$ is extraneous).

The final answer is $x=4$.