Preview 7 and Recap 7

Wednesday, January 25, 2023 2:03 PM

Preview 7

PREVIEW

Solve.

1. $-(7-4x)=9$

2. $4x-3=\frac{3}{2}x+7$

3. $\sqrt{2x+1}-5=-1$

PREVIEW

Solve.

1. $-(7-4x)=9$

Distribute "-1" through bracket: $-7+4x=9$

Collect constants: $+7 \quad +7$

Isolate x: $\frac{4x}{4}=\frac{16}{4}$

$x=4$

Check

LS	RS
$-(7-4(4))$	9
$-(7-16)$	
$-(-9)$	
9	✓

2. $4x-3=\frac{3}{2}x+7$

Eliminate fraction multiplying each term by 2: $2(4x)-2(3)=2\left(\frac{3}{2}x\right)+2(7)$

Collect x-terms: $8x-6=3x+14$ $\quad -3x \quad -3x$

Collect constants: $5x-6=14$ $\quad +6 \quad +6$

Isolate x: $\frac{5x}{5}=\frac{20}{5}$

$x=4$

Check

LS	RS
$4(4)-3$	$\frac{3}{2}(4)+7$
$16-3$	$\frac{12}{2}+7$
13	$6+7$
	13 ✓

3. $\sqrt{2x+1}-5=-1$

Collect constants, to isolate radical: $\sqrt{2x+1}-5=-1$ $\quad +5 \quad +5$

Square both sides: $\left(\sqrt{2x+1}\right)^2=(4)^2$

Collect constants: $2x+1=16$ $\quad -1 \quad -1$

Isolate x: $\frac{2x}{2}=\frac{15}{2}$

$x=\frac{15}{2}$

★ An extra thing we need to do ★

Find restrictions: radicand ≥ 0

$2x+1 \geq 0$

$-1 \quad -1$

collect constants: $\frac{2x}{2} \geq \frac{-1}{2}$

isolate x

$x \geq -\frac{1}{2}$

Check

LS	RS
$\sqrt{2(\frac{15}{2})+1}-5$	-1
$\sqrt{15+1}-5$	
$\sqrt{16}-5$	
$4-5$	
-1	✓

Recap 7

RECAP

1. For each equation
- give its restrictions
- solve it algebraically
- verify your solution by checking it in the original equation

a) $\frac{\sqrt{6-5x}}{3}=2$

b) $2+\sqrt{3x+1}=6$

2. The time, T seconds, for a pendulum to make one swing is given by this formula:

$$T=2\pi\sqrt{\frac{L}{9.8}}\text{, where } L \text{ is the length of the pendulum in meters}$$

If a pendulum takes 9 seconds to complete one swing, what is the length of that pendulum, correct to one decimal place?

RECAP

1. For each equation
- give its restrictions
- solve it algebraically
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a) $\frac{\sqrt{6-5x}}{3}=2$ · 3

radicand ≥ 0

$6-5x \geq 0$

$-5x \geq -6$

$x \leq \frac{-6}{-5}$

$\left(\sqrt{6-5x}\right)^2=(6)^2$

$6-5x=36$

$-5x=30$

$x=-6$

Check

LS	RS
$\frac{\sqrt{6-5(-6)}}{3}$	2
$\frac{\sqrt{6+30}}{3}$	
$\frac{6}{3}$	
2 ✓	

b) $2+\sqrt{3x+1}=6$

$\left(\sqrt{3x+1}\right)^2=(4)^2$

$3x+1=16$

$3x=15$

$x=5$

radicand ≥ 0

$3x+1 \geq 0$

$3x \geq -1$

$x \geq \frac{-1}{3}$

Check

LS	RS
$2+\sqrt{3(5)+1}$	6
$2+\sqrt{15+1}$	
$2+\sqrt{16}$	
$2+4$	
6 ✓	

2. The time, T seconds, for a pendulum to make one swing is given by this formula:

$$T=2\pi\sqrt{\frac{L}{9.8}}\text{, where } L \text{ is the length of the pendulum in meters}$$

If a pendulum takes 9 seconds to complete one swing, what is the length of that pendulum, correct to one decimal place?

$\frac{9}{2\pi}=\frac{2\pi}{2\pi}\sqrt{\frac{L}{9.8}}$

$\left(\frac{9}{2\pi}\right)^2=\left(\sqrt{\frac{L}{9.8}}\right)^2$

$8.\left(\frac{81}{4\pi^2}\right)=\left(\frac{L}{9.8}\right)\cdot(9.8)$

$L=\frac{(9.8)(81)}{(4\pi^2)}$

radicand ≥ 0

$9.8\left(\frac{L}{9.8}\right) \geq (0)\,9.8$

$L \geq 0$

Evaluate on the calculator: $L = 20.107188\,89$ meters

$L \doteq 20.1$ m