WARM-UP: REVIEW

Find the missing length. If necessary, round to the   nearest tenth.

$$a^2 + b^2 = c^2 \qquad \ell_1^2 + \ell_2^2 = h^2$$

$4^2 + 5^2 = c^2$
$16 + 25 = c^2$
$\sqrt{41} = \sqrt{c^2}$
≈ 6.4

1.
h $\sqrt{41}$ m
c

4 m
a
ℓ_2

ℓ_1 5 m
5

2.
$1^2 + 2^2 = c^2$
c
1 mm
$1 + 4 = c^2$
2 mm
$\sqrt{5} = \sqrt{c^2}$
$\boxed{c = \sqrt{5} \text{ mm}}$
≈ 2.2

3.
$5^2 + b^2 = 7^2$
$25 + b^2 = 49$
$-25 \qquad -25$
$\sqrt{b^2} = \sqrt{24}$
$b = \sqrt{24}$ ④
$= 2\sqrt{6}$ ft
≈ 4.9 ft

7 ft
5 ft
b

4.
9 mi
a
$a^2 + 3^2 = 9^2$
$a^2 + 9 = 81$
3 mi
$\sqrt{a^2} = \sqrt{72}$ ㊱
$= 6\sqrt{2}$
≈ 8.5

Warm Up

10.3 Solving Radical Equations

Essential Question
How can you solve an equation that contains square roots?

Essential Question

10.3 Notes with work

Core Concept

Squaring Each Side of an Equation

Words   If two expressions are equal, then their squares are also equal.

Algebra   If $a = b$, then $a^2 = b^2$.

$1^{st}: \sqrt{}$ alone

Example 1:

Solve each equation.

a. $\sqrt{x} + 5 = 13$
$ -5 \quad -5$
$(\sqrt{x})^2 = (8)^2$
$\boxed{X = 64}$

$\sqrt{64} + 5$
$ 13$

b. $3 - \sqrt{x} = 0$
$-3 \quad\quad -3$
$\sqrt{X} = -3$
$\overline{-1}$
$(\sqrt{x})^2 = (3)^2$
$\boxed{X = 9}$

$3 - \sqrt{9}$
$\blacksquare \qquad\qquad 0$

Core Concept

YOUR TURN:

Solve the equation. Check your solution.

1. $(\sqrt{x})^2 = (6)^2$
$\boxed{X = 36}$

$\sqrt{36} = 6 \checkmark$

2. $\sqrt{x} - 7 = 3$
$ +7 \quad +7$
$(\sqrt{x})^2 = (10)^2$
$\boxed{X = 100}$

$\sqrt{100} - 7 = 3$
$\checkmark$

3. $\sqrt{y} + 15 = 22$
$-15 \quad -15$
$(\sqrt{y})^2 = (7)^2$
$\boxed{y = 49}$

$\sqrt{49} + 15$
$7 + 15$
$22 \checkmark$

4. $1 - \sqrt{c} = -2$
$-1 \qquad\quad -1$
$-\sqrt{c} = -3$
$\overline{-1} \qquad \overline{-1}$
$(\sqrt{c})^2 = (3)^2$
$\boxed{c = 9}$

$1 - \sqrt{9} = -2$
$1 - 3 = -2$
$\checkmark$

Monitoring Progress 1-4

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Example 2:

1) $4\sqrt{x+2} + 3 = 19$ Original equation

   $-3 \quad -3$

2) $4\sqrt{x+2} = 16$ Subtract 3 from each side.

3) $\dfrac{4\sqrt{x+2}}{4} = \dfrac{16}{4}$ Divide each side by 4.

   $(\sqrt{x+2})^2 = (4)^2$

4) $(\sqrt{x+2})^2 = 4^2$ Square each side of the equation.

5) $x + 2 = 16$ Simplify.

   $-2 \quad -2$

6) $x = 14$ Subtract 2 from each side.

▶ The solution is $x = 14$.

$4\sqrt{14+2} + 3 = 19$

$4\sqrt{16} + 3 = 19$

$4(4) + 3 = 19$

$16 + 3 = 19 \checkmark$

Example 2

Example 3:

Solve $(\sqrt{2x-1})^2 = (\sqrt{x+4})^2$

$2x - 1 = x + 4$

$-x \qquad -x$

$x - 1 = 4$

$+1 \quad +1$

$\boxed{x = 5}$

$\sqrt{2(5)-1} = \sqrt{9}$

$\sqrt{5+4} = \sqrt{9} \checkmark$

Example 3

3

10.3 Notes with work

Example 4:

Solve $\left(\sqrt[3]{5x-2}\right)^3 = (12.)^3$ $\rightarrow$ $12 \cdot 12 \cdot 12 = 1728$

$5x - 2 = 1728$
$\quad +2 \qquad +2$

$\dfrac{5x}{5} = \dfrac{1730}{5}$

$\boxed{x = 346}$

$\checkmark \sqrt[3]{5(346)-2}$

$\sqrt[3]{5(346)-2}$

■

12

Example 4

YOUR TURN:

Solve the equation. Check your solution.

5. $\sqrt{x+4} + 7 = 11$
$\qquad -7 \quad -7$
$(\sqrt{x+4})^2 = (4)^2$
$x + 4 = 16$
$\quad -4 \quad -4$
$\boxed{x = 12}$
$\checkmark \sqrt{12+4} + 7 = 11$

6. $15 = 6 + \sqrt{3w-9}$
$\quad -6 \quad -6$
$(9)^2 = (\sqrt{3w-9})^2$
$81 = 3w - 9$
$\quad +9 \qquad +9$
$\dfrac{90}{3} = \dfrac{3w}{3}$
$\boxed{30 = w}$
$\checkmark 15 = 6 + \sqrt{3(30)-9}$

7. $\left(\sqrt{3x+1}\right)^2 = \left(\sqrt{4x-7}\right)^2$
$3x + 1 = 4x - 7$
$-3x \qquad -3x$
$1 = x - 7$
$+7 \qquad +7$
$\boxed{8 = x}$
$\checkmark \sqrt{3(8)+1} = \sqrt{25}$
$\sqrt{4(8)-7} = \sqrt{25}$

8. $\left(\sqrt{n}\right)^2 = \left(\sqrt{5n-1}\right)^2$
$n = 5n - 1$
$-5n \quad -5n$
$\dfrac{-4n}{-4} = \dfrac{-1}{-4}$
$\boxed{n = \frac{1}{4}}$
$\checkmark \sqrt{\frac{1}{4}} = \frac{1}{2}$
$\sqrt{5\left(\frac{1}{4}\right)-1} = \frac{1}{2}$

9. $\sqrt[3]{y} - 4 = 1$
$\qquad +4 \quad +4$
$\left(\sqrt[3]{y}\right)^3 = (5)^3$
$\boxed{y = 125}$
$\checkmark \sqrt[3]{125} - 4 = 1$

10. $\left(\sqrt[3]{3c+7}\right)^3 = (10)^3$
$3c + 7 = 1000$
$\quad -7 \qquad -7$
$\dfrac{3c}{3} = \dfrac{993}{3}$
$\boxed{c = 331}$
$\checkmark \sqrt[3]{3(331)+7} = 10$

Monitoring Progress 5-10

4

Example 5:

Solve $\left(x\right)^2 = \left(\sqrt{x+6}.\right)^2$ $\boxed{x=3}$

$$x^2 = x + 6$$
$$-x - 6 \quad -x - 6$$

$$x^2 - x - 6 = 0$$
$$(x-3)(x+2) = 0$$

$$(x-3) = 0 \qquad x+2 = 0$$
$$+3 \quad +3 \qquad -2 \quad -2$$
$$x = 3 \qquad x = -2$$

$$x = 3, -2$$

1) graph
★ 2) complete the □
3) square root
★ 4) quadratic formula
5) calculator
→ 6) factoring

$\sqrt{3+6}$ 3

$\sqrt{-2+6}$ 2

∎

Example 5
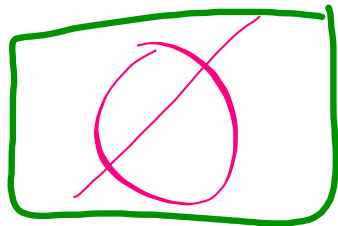
Example 6:

Solve $13 + \sqrt{5n} = 3.$
$$-13 \qquad -13$$

$$\sqrt{5n} = -10$$

∅

$$n \neq 20$$

$13 + \sqrt{5(20)}$

23

Example 6

YOUR TURN:

Solve each equation.

a. $2x + 1 = 10$

$$-1 \quad -1$$
$$\frac{2x}{2} = \frac{9}{2}$$
$$\boxed{x = \frac{9}{2}}$$

b. $x^2 + 1 = 10$

$$-1 \quad -1$$
$$\sqrt{x^2} = \sqrt{9}$$
$$\boxed{x = \pm 3}$$

c. $\sqrt{x} + 1 = 10$

$$-1 \quad -1$$
$$(\sqrt{x})^2 = (9)^2$$
$$\boxed{x = 81}$$

Closure

What do you feel best about and what concept do you still feel unsure about?

_____

10.3 WS from the WB

A: 3rd column and 22

B: evens

C: 1 - 3, 7 - 9, 16 - 18