

Learning Goal 4.3 Practice

Solve for the variable algebraically. Remember to check for extraneous solutions.

$$1) (n)^2 = (\sqrt{-70 + 17n})$$

$$n^2 = -70 + 17n$$

$$\begin{array}{r} n^2 = -70 + 17n \\ -17n \quad -17n \end{array}$$

$$n^2 - 17n = -70$$

$$\begin{array}{r} n^2 - 17n = -70 \\ +70 \quad +70 \end{array}$$

$$n^2 - 17n + 70 = 0$$

$$(n-7)(n-10) = 0$$

$$\begin{array}{c} (n=7) \quad (n=10) \end{array}$$

$$3) 2 + \sqrt{4x-8} = x$$

$$\begin{array}{r} 2 + \sqrt{4x-8} = x \\ -2 \quad -2 \end{array}$$

$$(\sqrt{4x-8})^2 = (x-2)^2$$

$$4x-8 = x^2-4x+4$$

$$\begin{array}{r} 4x-8 = x^2-4x+4 \\ -4x \quad -4x \\ -8 = x^2-8x+4 \\ +8 \quad +8 \\ 0 = x^2-8x+12 \end{array}$$

$$\begin{array}{r} -8 \quad -2 \\ -6 \quad -2 \\ 12 \end{array}$$

$$(x-6)(x-2) = 0$$

$$\begin{array}{c} (x=6) \quad (x=2) \end{array}$$

$$5) (v+4)^2 = (\sqrt{6v+15})^2$$

$$v^2 + 8v + 16 = 6v + 15$$

$$\begin{array}{r} v^2 + 8v + 16 = 6v + 15 \\ -6v \quad -6v \end{array}$$

$$v^2 + 2v + 16 = 15$$

$$\begin{array}{r} v^2 + 2v + 16 = 15 \\ -15 \quad -15 \end{array}$$

$$v^2 + 2v + 1 = 0$$

$$\begin{array}{r} 2 \\ 1 \quad 1 \\ 1 \end{array}$$

$$(v+1)(v+1) = 0$$

$$v = -1$$

square each side

Check:

$$① (7) = \sqrt{-70 + 17(7)}$$

$$7 = \sqrt{49}$$

$$7 = 7 \checkmark$$

$$② 10 = \sqrt{-70 + 17(10)}$$

$$10 = \sqrt{100}$$

$$10 = 10 \checkmark$$

Don't forget to isolate absolute value

check:

$$2 + \sqrt{4(6)-8} = 6$$

$$2 + \sqrt{16} = 6$$

$$2 + 4 = 6$$

$$6 = 6 \checkmark$$

check:

$$2 + \sqrt{4(2)-8} = 2$$

$$2 + \sqrt{0} = 2$$

$$2 = 2 \checkmark$$

k-3
k ² -3k
-3k+9

$$2) (\sqrt{27+6n})^2 = (n)^2$$

$$27 + 6n = n^2$$

$$\begin{array}{r} 27 + 6n = n^2 \\ -6n \quad -6n \end{array}$$

$$27 = n^2 - 6n$$

$$\begin{array}{r} 27 = n^2 - 6n \\ -27 \quad -27 \end{array}$$

$$0 = n^2 - 6n - 27$$

$$\begin{array}{r} -6 \quad -9 \\ -9 \quad -27 \end{array}$$

$$(n-9)(n+3)$$

$$\begin{array}{c} (n=9) \quad (n=-3) \end{array}$$

Extraneous!

① Check:

$$\sqrt{27+6(9)} = 9$$

$$\sqrt{81} = 9$$

$$9 = 9 \checkmark$$

$$② \sqrt{27+6(-3)} = -3$$

$$\sqrt{27-18} = -3$$

$$\sqrt{9} = -3$$

$$3 = -3$$

$$X$$

$$4) -3 = \sqrt{3k-11} - k$$

$$\begin{array}{r} -3 = \sqrt{3k-11} - k \\ +k \quad +k \end{array}$$

$$(k-3)^2 = (\sqrt{3k-11})^2$$

$$k^2 - 6k + 9 = 3k - 11$$

$$\begin{array}{r} k^2 - 6k + 9 = 3k - 11 \\ -3k \quad -3k \end{array}$$

$$k^2 - 9k + 9 = -11$$

$$\begin{array}{r} k^2 - 9k + 9 = -11 \\ +11 \quad +11 \end{array}$$

$$k^2 - 9k + 20 = 0$$

$$\begin{array}{r} -9 \quad -4 \\ -5 \quad -4 \\ 20 \end{array}$$

$$(k-5)(k-4) = 0$$

$$\begin{array}{c} (k=5) \quad (k=4) \end{array}$$

check:

$$-3 = \sqrt{3(5)-11} - 5$$

$$-3 = \sqrt{4} - 5$$

$$-3 = 2 - 5$$

$$-3 = -3 \checkmark$$

check:

$$-3 = \sqrt{3(4)-11} - 4$$

$$-3 = \sqrt{1} - 4$$

$$-3 = -3 \checkmark$$

$$6) (v+4)^2 = (\sqrt{2v+32})^2$$

$$v^2 + 8v + 16 = 2v + 32$$

$$\begin{array}{r} v^2 + 8v + 16 = 2v + 32 \\ -2v \quad -2v \end{array}$$

$$v^2 + 6v + 16 = 32$$

$$\begin{array}{r} v^2 + 6v + 16 = 32 \\ -32 \quad -32 \end{array}$$

$$v^2 + 6v - 16 = 0$$

$$(v+8)(v-2) = 0$$

$$\begin{array}{c} (v=8) \quad (v=2) \end{array}$$

Extraneous

check:

$$-8 + 4 = \sqrt{2(-8)+32}$$

$$-4 = \sqrt{16}$$

$$-4 = 4$$

check:

$$2 + 4 = \sqrt{2(2)+32}$$

$$6 = \sqrt{36}$$

$$6 = 6 \checkmark$$

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Date _____

Solve for the variable algebraically. Remember to check for extraneous solutions.

1) $n = \sqrt{-70 + 17n}$

 $\{7, 10\}$

2) $\sqrt{27 + 6n} = n$

 $\{9\}$

3) $2 + \sqrt{4x - 8} = x$

 $\{6, 2\}$

4) $-3 = \sqrt{3k - 11} - k$

 $\{4, 5\}$

5) $v + 4 = \sqrt{6v + 15}$

 $\{-1\}$

6) $v + 4 = \sqrt{2v + 32}$

 $\{2\}$