

Radical Equations - Part 2

Solve each equation. Remember to check for extraneous solutions.

1) $(\sqrt{110-n})(n)^2$ $n \neq -11$ $n=10$

$$110-n = n^2$$

$$0 = n^2 + n - 110$$

$$0 = (n+11)(n-10)$$

3) $(\sqrt{30-x})^2 = (x)^2$ $x \neq -6$ $x=5$

$$30-x = x^2$$

$$0 = x^2 + x - 30$$

$$0 = (x+6)(x-5)$$

5) $x = \sqrt{42-x}$

$$x^2 = 42-x$$

$$x^2 + x - 42 = 0$$

$$(x+7)(x-6) = 0$$

$$x \neq -7 \quad x=6$$

7) $\sqrt{4n} = n$

$$4n = n^2$$

$$0 = n^2 - 4n$$

$$0 = n(n-4)$$

$$n=0 \quad n=4$$

9) $r = \sqrt{10r}$

$$r^2 = 10r$$

$$r^2 - 10r = 0$$

$$r(r-10)$$

$$r=0 \quad r=10$$

11) $b = \sqrt{-4+4b}$

$$b^2 = -4+4b$$

$$b^2 - 4b + 4 = 0$$

$$(b-2)(b-2) = 0$$

$$b=2$$

13) $\sqrt{-16+10a} = a$

$$-16+10a = a^2$$

$$0 = a^2 - 10a + 16$$

$$0 = (a-8)(a-2)$$

$$a=8 \quad a=2$$

2) $(p)^2 = (\sqrt{2-p})^2$

$$p^2 = 2-p$$

$$p^2 + p - 2 = 0$$

$$(p+2)(p-1) = 0$$

$$p \neq 2 \quad p=1$$

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

$$x^2 = 8x$$

$$x^2 - 8x = 0$$

$$x(x-8) = 0$$

$$x=0 \quad x=8$$

6) $\sqrt{12-r} = r$

$$12-r = r^2$$

$$0 = r^2 + r - 12$$

$$0 = (r+4)(r-3)$$

$$r \neq 4 \quad r=3$$

8) $\sqrt{5v} = v$

$$5v = v^2$$

$$0 = v^2 - 5v$$

$$0 = v(v-5)$$

$$v=0 \quad v=5$$

10) $m = \sqrt{56-m}$

$$m^2 = 56-m$$

$$m^2 + m - 56 = 0$$

$$(m+8)(m-7)$$

$$m \neq 8 \quad m=7$$

12) $r = \sqrt{8r}$

$$r^2 = 8r$$

$$r^2 - 8r = 0$$

$$r(r-8) = 0$$

$$r=0 \quad r=8$$

14) $r = \sqrt{-1-2r}$

$$r^2 = -1-2r$$

$$r^2 + 2r + 1 = 0$$

$$(r+1)(r+1) = 0$$

$$r = -1$$

$$\emptyset$$

$$15) \sqrt{-45+14n} = n$$

$$-45+14n = n^2$$

$$0 = n^2 - 14n + 45$$

$$0 = (n-9)(n-5)$$

$$n=9 \quad n=5$$

$$16) x = \sqrt{110-x}$$

$$x^2 = 110-x$$

$$x^2 + x - 110 = 0$$

$$(x+11)(x-10) = 0$$

$$x = -11 \quad x = 10$$

$$17) \sqrt{9n} = n$$

$$9n = n^2$$

$$0 = n^2 - 9n$$

$$0 = n(n-9)$$

$$n=0 \quad n=9$$

$$18) x = \sqrt{40-3x}$$

$$x^2 = 40-3x$$

$$x^2 + 3x - 40 = 0$$

$$(x+8)(x-5) = 0$$

$$x = -8 \quad x = 5$$

$$19) \sqrt{90-n} = n$$

$$90-n = n^2$$

$$0 = n^2 + n - 90$$

$$0 = (n+10)(n-9)$$

$$n = -10 \quad n = 9$$

$$20) x = \sqrt{-70+17x}$$

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

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

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

$$x = 10 \quad x = 7$$

$$21) \sqrt{4n+8} = n+3$$

$$4n+8 = n^2+6n+9$$

$$0 = n^2+2n+1$$

$$0 = (n+1)(n+1)$$

$$n = -1$$

$$22) -n + \sqrt{6n+19} = 2$$

$$\sqrt{6n+19} = 2+n$$

$$6n+19 = 4+4n+n^2$$

$$0 = n^2 - 2n - 15$$

$$0 = (n-5)(n+3)$$

$$n = 5 \quad n = -3$$

$$23) 4 + \sqrt{-3m+10} = m$$

$$\sqrt{-3m+10} = m-4$$

$$-3m+10 = m^2-8m+16$$

$$0 = m^2-5m+6$$

$$0 = (m-3)(m-2)$$

$$m = 3 \quad m = 2$$

$$\emptyset$$

$$24) x-5 = \sqrt{x+1}$$

$$x^2-10x+25 = x+1$$

$$x^2-11x+24 = 0$$

$$(x-8)(x-3) = 0$$

$$x = 8 \quad x = 3$$

$$25) n-7 = \sqrt{3n-21}$$

$$n^2-14n+49 = 3n-21$$

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

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

$$n = 10 \quad n = 7$$

$$26) b-6 = \sqrt{18-3b}$$

$$b^2-12b+36 = 18-3b$$

$$b^2-9b+18 = 0$$

$$(b-6)(b-3) = 0$$

$$b = 6 \quad b = 3$$

$$27) -3 + \sqrt{m+59} = m$$

$$\sqrt{m+59} = m+3$$

$$m+59 = m^2+6m+9$$

$$0 = m^2+5m-50$$

$$0 = (m+10)(m-5)$$

$$m = -10 \quad m = 5$$

$$28) \sqrt{7a-54} - a = -6$$

$$\sqrt{7a-54} = a-6$$

$$7a-54 = a^2-12a+36$$

$$0 = a^2-19a+90$$

$$0 = (a-9)(a-10)$$

$$a = 9 \quad a = 10$$