

Solving Radical Equations WS, pg 1 of 3

1) $46 = 5\sqrt{p+5} - 4$

$50 = 5\sqrt{p+5}$

$10 = \sqrt{p+5}$

$(10)^2 = (\sqrt{p+5})^2$

$100 = p+5$

$p = 95$

check

$46 = 5\sqrt{95+5} - 4$

$46 = 5\sqrt{100} - 4$

$46 = 5(10) - 4$

$46 = 50 - 4$

$46 = 46$

✓

2) $10 + \sqrt{x-7} = 7$

$\sqrt{x-7} = -3$

$(\sqrt{x-7})^2 = (-3)^2$

$x-7 = 9$

$x = 16$

No solution

check

$10 + \sqrt{16-7} = 7$

$10 + \sqrt{9} = 7$

$10 + 3 = 7$

$13 = 7$

x

3) $-24 = -4\sqrt{4-5p}$

$6 = \sqrt{4-5p}$

$(6)^2 = (\sqrt{4-5p})^2$

$36 = 4-5p$

$40 = -5p$

$p = -8$

check

$-24 = -4\sqrt{4-5(-8)}$

$-24 = -4\sqrt{-4+40}$

$-24 = -4\sqrt{36}$

$-24 = -4(6)$

$-24 = -24$

✓

4) $7 + \sqrt{8-r} = 7$

$\sqrt{8-r} = 0$

$(\sqrt{8-r})^2 = (0)^2$

$8-r = 0$

$-r = -8$

$r = 8$

check

$7 + \sqrt{8-8} = 7$

$7 + \sqrt{0} = 7$

$7 + 0 = 7$

$7 = 7$

✓

5) $1 + \sqrt{6n-5} = 8$

$\sqrt{6n-5} = 7$

$(\sqrt{6n-5})^2 = 7^2$

$6n-5 = 49$

$6n = 54$

$n = 9$

check

$1 + \sqrt{6(9)-5} = 8$

$1 + \sqrt{54-5} = 8$

$1 + \sqrt{49} = 8$

$1 + 7 = 8$

$8 = 8$

✓

6) $24 = 3\sqrt{8b} + 12$

$12 = 3\sqrt{8b}$

$4 = \sqrt{8b}$

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

$16 = 8b$

$b = 2$

check

$24 = 3\sqrt{8(2)} + 12$

$24 = 3\sqrt{16} + 12$

$24 = 3(4) + 12$

$24 = 12 + 12$

$24 = 24$

✓

7) $\sqrt{-24+10m} = m$

$(\sqrt{-24+10m})^2 = m^2$

$-24+10m = m^2$

$m^2 - 10m + 24 = 0$

$(m-4)(m-6) = 0$

$m-4=0 \quad m-6=0$

$m=4, m=6$

checks

$\sqrt{-24+10(4)} = 4$

$\sqrt{-24+40} = 4$

$\sqrt{16} = 4$

$4 = 4$

✓

$\sqrt{-24+10(6)} = 6$

$\sqrt{-24+60} = 6$

$\sqrt{36} = 6$

$6 = 6$

✓

Solving Radical Equations WS, pg 2 of 3

8) $\sqrt{-72+17b} = b$
 $(\sqrt{-72+17b})^2 = b^2$
 $-72+17b = b^2$
 $b^2 - 17b + 72 = 0$
 $(b-8)(b-9) = 0$
 $b-8=0 \quad b-9=0$
 $b=8, b=9$

checks

$\sqrt{-72+17(8)} = 8$ $\sqrt{-72+17(9)} = 9$
 $\sqrt{-72+136} = 8$ $\sqrt{-72+153} = 9$
 $\sqrt{64} = 8$ $\sqrt{81} = 9$
 $8=8$ $9=9$
 \checkmark \checkmark

9) $v = \sqrt{3v}$
 $(v)^2 = (\sqrt{3v})^2$
 $v^2 = 3v$
 $v^2 - 3v = 0$
 $v(v-3) = 0$
 $v=0 \quad v-3=0$
 $v=0, v=3$

checks

$0 = \sqrt{3(0)}$ $3 = \sqrt{3(3)}$
 $0 = \sqrt{0}$ $3 = \sqrt{9}$
 $0 = 0$ $3 = 3$
 \checkmark \checkmark

10) $a = \sqrt{6-a}$
 $(a)^2 = (\sqrt{6-a})^2$
 $a^2 = 6-a$
 $a^2 + a - 6 = 0$
 $(a-2)(a+3) = 0$
 $a-2=0 \quad a+3=0$
 $a=2, a=-3$ extraneous

checks

$2 = \sqrt{6-2}$ $-3 = \sqrt{6-(-3)}$
 $2 = \sqrt{4}$ $-3 = \sqrt{9}$
 $2 = 2$ $-3 = 3$
 \checkmark \times

11) $\sqrt{-6+5v} = v$
 $(\sqrt{-6+5v})^2 = (v)^2$
 $-6+5v = v^2$
 $v^2 - 5v + 6 = 0$
 $(v-2)(v-3) = 0$
 $v-2=0 \quad v-3=0$
 $v=2, v=3$

checks

$\sqrt{-6+5(2)} = 2$ $\sqrt{-6+5(3)} = 3$
 $\sqrt{-6+10} = 2$ $\sqrt{-6+15} = 3$
 $\sqrt{4} = 2$ $\sqrt{9} = 3$
 $2 = 2$ $3 = 3$
 \checkmark \checkmark

12) $x = \sqrt{-54+15x}$
 $(x)^2 = (\sqrt{-54+15x})^2$
 $x^2 = -54+15x$
 $x^2 - 15x + 54 = 0$
 $(x-6)(x-9) = 0$
 $x-6=0 \quad x-9=0$
 $x=6, x=9$

checks

$6 = \sqrt{-54+15(6)}$ $9 = \sqrt{-54+15(9)}$
 $6 = \sqrt{36}$ $9 = \sqrt{81}$
 $6 = 6$ $9 = 9$
 \checkmark \checkmark

13) $5 = \sqrt[3]{x-3}$
 $(5)^3 = (\sqrt[3]{x-3})^3$
 $125 = x-3$
 $x = 128$

check

$5 = \sqrt[3]{128-3}$
 $5 = \sqrt[3]{125}$
 $5 = 5$
 \checkmark

14) $9 = 3\sqrt[3]{x+7} - 18$
 $27 = 3\sqrt[3]{x+7}$
 $9 = \sqrt[3]{x+7}$
 $(9)^3 = (\sqrt[3]{x+7})^3$
 $729 = x+7$
 $x = 722$

check

$9 = 3\sqrt[3]{722+7} - 18$
 $9 = 3\sqrt[3]{729} - 18$
 $9 = 3(9) - 18$
 $9 = 27 - 18$
 $9 = 9$
 \checkmark

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15) $2\sqrt[3]{x+12}=4$

$2\sqrt[3]{x} = -8$

$\sqrt[3]{x} = -4$

$(\sqrt[3]{x})^3 = (-4)^3$

$x = -64$

check

$2\sqrt[3]{-64+12}=4$

$2(-4)+12=4$

$-8+12=4$

$4=4$

✓

16) $-3\sqrt[4]{x+8}=9$

$\sqrt[4]{x+8} = -3$

$(\sqrt[4]{x+8})^4 = (-3)^4$

$x+8=81$

$x=73$

No solution

check

$-3\sqrt[4]{73+8}=9$

$-3\sqrt[4]{81}=9$

$-3(3)=9$

$-9=9$

X

17) $\sqrt{6r+15}-r=4$

$\sqrt{6r+15} = r+4$

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

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

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

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

$r+1=0$

$r=-1$

check

$\sqrt{6(-1)+15} - (-1) = 4$

$\sqrt{-6+15} + 1 = 4$

$\sqrt{9} + 1 = 4$

$3+1=4$

$4=4$

✓

18) $n = 2 + \sqrt{24-3n}$

$n-2 = \sqrt{24-3n}$

$(n-2)^2 = (\sqrt{24-3n})^2$

$n^2-4n+4 = 24-3n$

$n^2-n-20=0$

$(n+4)(n-5)=0$

$n+4=0$ $n-5=0$

$n=-4$ $n=5$

CAUTION

checks

$-4 = 2 + \sqrt{24-3(-4)}$ $5 = 2 + \sqrt{24-3(5)}$

$-4 = 2 + \sqrt{24+12}$ $5 = 2 + \sqrt{2+15}$

$-4 = 2 + \sqrt{36}$ $5 = 2 + \sqrt{9}$

$-4 = 2 + 6$ $5 = 2 + 3$

$-4 = 8$ $5 = 5$

X

✓

19) $-3 = \sqrt{7-3x} - x$

$x-3 = \sqrt{7-3x}$

$(x-3)^2 = (\sqrt{7-3x})^2$

$x^2-6x+9 = 7-3x$

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

$(x-2)(x-1)=0$

$x-2=0$ $x-1=0$

$x=2$ $x=1$

No solution

$-3 = \sqrt{7-3(2)} - 2$ $-3 = \sqrt{7-3(1)} - 1$

$-3 = \sqrt{7-6} - 2$ $-3 = \sqrt{7-3} - 1$

$-3 = \sqrt{1} - 2$ $-3 = \sqrt{4} - 1$

$-3 = 1 - 2$ $-3 = 2 - 1$

$-3 = -1$ $-3 = 1$

X

X

20) $\sqrt{a-2} = a-2$

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

$a-2 = a^2-4a+4$

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

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

$a-2=0$ $a-3=0$

$a=2$ $a=3$

$\sqrt{2-2} = 2-2$ $\sqrt{3-2} = 3-2$

$\sqrt{0} = 0$ $\sqrt{1} = 1$

$0=0$ $1=1$

✓

✓