

Check to make sure solutions work!

College Algebra CHS

Radical Equations

- No negative radicand
- $\sqrt{\quad} \neq$  negative #
- Solutions actually work

Name Key

Date \_\_\_\_\_

Solve each equation. Remember to check for extraneous solutions.

$$1) \left( (-17 - 2n)^{\frac{1}{2}} \right)^2 = \left( (-8 - n)^{\frac{1}{2}} \right)^2$$

$$-17 - 2n = -8 - n$$

$$\boxed{-9 = n}$$

$$2) \left( (15 - x)^{\frac{1}{2}} \right)^2 = \left( (3x - 13)^{\frac{1}{2}} \right)^2$$

$$15 - x = 3x - 13$$

$$28 = 4x$$

$$\boxed{7 = x}$$

\* when you just square a  $\frac{1}{2}$  power or a square root alone just cancel

\* when you square a binomial, FOIL

$$3) \left( (m + 10)^{\frac{1}{2}} \right)^2 = (10)^2$$

$$m + 10 = 100$$

$$\boxed{m = 90}$$

$$4) 10 = \left( \frac{x}{7} \right)^{\frac{1}{2}} + 9$$

$$\left( 1 \right)^2 = \left( \frac{x}{7} \right)^{\frac{1}{2}}^2$$

$$1 = \frac{x}{7} \quad \boxed{x = 7}$$

$$5) 7 = 4 + \sqrt{a + 5}$$

$$3 = \sqrt{a + 5}$$

$$9 = a + 5$$

$$\boxed{a = 4}$$

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

$$x^2 = -5 + 6x$$

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

$$(x - 5)(x - 1) = 0$$

$$\boxed{x = 5}$$

$$\boxed{x = 1}$$

$$7) \left( \sqrt{-63 + 16n} \right)^2 = (n)^2$$

$$-63 + 16n = n^2$$

$$n^2 - 16n + 63 = 0$$

$$(n - 9)(n - 7) = 0$$

$$\boxed{n = 9}$$

$$\boxed{n = 7}$$

$$8) \left( \sqrt{b - 2} \right)^2 = (1)^2$$

$$b - 2 = 1$$

$$\boxed{b = 3}$$

FOIL

$$9) (m - 2)^2 = (\sqrt{3m - 2})^2$$

$$m^2 - 4m + 4 = 3m - 2$$

$$m^2 - 7m + 6 = 0$$

$$(m - 6)(m - 1) = 0$$

$$\boxed{m = 6}$$

$$\cancel{m = 1}$$

$$1 - 2 \neq \sqrt{3(1) - 2}$$

FOIL

$$10) (x - 4)^2 = (\sqrt{6x - 29})^2$$

$$x^2 - 8x + 16 = 6x - 29$$

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

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

$$\boxed{x = 9}$$

$$\boxed{x = 5}$$

11)  $(\sqrt{7a+35})^2 = (a+5)^2$  <sup>FoIL</sup>  
 $7a+35 = a^2+10a+25$   
 $a^2+3a-10=0$   
 $(a+5)(a-2)=0$   $a=-5$   
 $a=2$

12)  $(\sqrt{36-4n})^2 = (n-1)^2$  <sup>FoIL</sup>  
 $36-4n = n^2-2n+1$   
 $n^2+2n-35=0$   
 $(n+7)(n-5)=0$   $n=-7$   
 $n=5$

13)  $(1+\sqrt{3-m})^2 = (\sqrt{8-2m})^2$  <sup>FoIL</sup>  
 $1+2\sqrt{3-m}+3-m = 8-2m$   
 $(2\sqrt{3-m})^2 = (4-m)^2$  <sup>FoIL</sup>  
 $4(3-m) = 16-8m+m^2$   
 $12-4m = 16-8m+m^2$   
 $m^2-4m+4=0$   
 $(m-2)(m-2)=0$   
 $m=2$

14)  $(3-\sqrt{9-3a})^2 = (\sqrt{-3a})^2$  <sup>FoIL</sup>  
 $9-6\sqrt{9-3a}+9-3a = -3a$   
 $-6\sqrt{9-3a} = -18$   
 $(\sqrt{9-3a})^2 = (3)^2$   
 $9-3a = 9$   
 $-3a = 0$   
 $a=0$

15)  $(\sqrt{2-a})^2 = (\sqrt{1-4a-1})^2$  <sup>FoIL</sup>  
 $2-a = 1-4a-2\sqrt{1-4a}+1$   
 $(3a)^2 = (-2\sqrt{1-4a})^2$   
 $9a^2 = 4(1-4a)$   
 $9a^2 = 4-16a$   
 $9a^2+16a-4=0$   
 $(x+2)(9x-2)=0$   
 $x=-2$   
 $x=2/9$   
 $\sqrt{2-2/9} \neq \sqrt{1-4(2/9)}-1$   
 $16/9 \neq 1/3-1$

16)  $(1-\sqrt{3-p})^2 = (\sqrt{2-p})^2$   
 $1-2\sqrt{3-p}+3-p = 2-p$   
 $-2\sqrt{3-p} = -2$   
 $(\sqrt{3-p})^2 = (1)^2$   
 $3-p = 1$   
 $p=2$

17)  $(x-3)^2 = (\sqrt{17-4x})^2$  <sup>FoIL</sup>  
 $x^2-6x+9 = 17-4x$   
 $x^2-2x-8=0$   
 $(x-4)(x+2)=0$   
 $x=4$   
 $x=-2$   
 $-2-3 \neq \sqrt{17-4(-2)}$

18)  $(r)^2 = (\sqrt{-1-2r})^2$   
 $r^2 = -1-2r$   
 $r^2+2r+1=0$   
 $(r+1)(r+1)=0$   
 $r=-1$   
 $\text{No solution}$

19)  $n = -6 + \sqrt{4n+56}$   
 $(n+6)^2 = (\sqrt{4n+56})^2$  <sup>FoIL</sup>  
 $n^2+12n+36 = 4n+56$   
 $n^2+8n-20=0$   
 $(n+10)(n-2)=0$   
 $n=2$   
 $n=10$   
 $-10 \neq -6 + \sqrt{4(-10)+56}$

20)  $k = 10 + \sqrt{44-5k}$   
 $k-10 = \sqrt{44-5k}$   
 $k^2-20k+100 = 44-5k$   
 $k^2-15k+56=0$   
 $(k-8)(k-7)=0$   
 $k=8$   
 $k=7$   
 $8 \neq 10 + \sqrt{44-5(8)}$   
 $7 \neq 10 + \sqrt{44-5(7)}$   
 $\text{No solution}$

21)  $(\sqrt{4-v}+5)^2 = (\sqrt{6v+1})^2$  <sup>FoIL</sup>  
 $4-v+10\sqrt{4-v}+25 = 6v+1$   
 $(10\sqrt{4-v})^2 = (7v-28)^2$  <sup>FoIL</sup>  
 $100(4-v) = 49v^2 - 392v + 784$   
 $400 - 100v = 49v^2 - 392v + 784$   
 $49v^2 - 292v + 384 = 0$   
 $(x-4)(49x-96)=0$   
 $x=4$   
 $x=96/49$   
 $292 \pm \sqrt{85264 - 4(49)(384)}$   
 $292 \pm \sqrt{10000}$   
 $98$

22)  $(x)^2 = (\sqrt{56-x})^2$   
 $x^2 = 56-x$   
 $x^2+x-56=0$   
 $(x+8)(x-7)=0$   
 $x=8$   
 $x=7$

18816  
196 96

## Radical Equations

Solve each equation. Remember to check for extraneous solutions.

1)  $(-17 - 2n)^{\frac{1}{2}} = (-8 - n)^{\frac{1}{2}}$

2)  $(15 - x)^{\frac{1}{2}} = (3x - 13)^{\frac{1}{2}}$

3)  $(m + 10)^{\frac{1}{2}} = 10$

4)  $10 = \left(\frac{x}{7}\right)^{\frac{1}{2}} + 9$

5)  $7 = 4 + \sqrt{a + 5}$

6)  $x = \sqrt{-5 + 6x}$

7)  $\sqrt{-63 + 16n} = n$

8)  $\sqrt{b - 2} = 1$

9)  $m - 2 = \sqrt{3m - 2}$

10)  $x - 4 = \sqrt{6x - 29}$

$$11) \sqrt{7a+35} = a+5$$

$$12) \sqrt{36-4n} = n-1$$

$$13) 1 + \sqrt{3-m} = \sqrt{8-2m}$$

$$14) 3 - \sqrt{9-3a} = \sqrt{-3a}$$

$$15) \sqrt{2-a} = \sqrt{1-4a} - 1$$

$$16) 1 - \sqrt{3-p} = \sqrt{2-p}$$

$$17) x - 3 = \sqrt{17-4x}$$

$$18) r = \sqrt{-1-2r}$$

$$19) n = -6 + \sqrt{4n+56}$$

$$20) k = 10 + \sqrt{44-5k}$$

$$21) \sqrt{4-v} + 5 = \sqrt{6v+1}$$

$$22) x = \sqrt{56-x}$$