COLLEGE ALGEBRA NAME: Amanda Lord

GPS # 24 **2.8 ADDITIONAL EQUATIONS AND INEQUALITIES II** Class Time: _____ Date: _____

Useful Guidelines:

* To solve an equations with radicals:
  - Step 1: Isolate one radical term on one side of the equation.
  - Step 2: Raise both sides of the equation to a power that is the same as the index of the radical.
  - Step 3: Solve the resulting equation; if it still contains a radical, repeat step 1 and step 2.
  - Step 4: Check all potential solutions in the original equation.
* To solve a quadratic inequality:
  - Step 1: Write the inequality as a quadratic equation and solve.
  - Step 2: Use the numbers solved from step 1 to divide a number line into intervals.
  - Step 3: Substitute a test number from each interval into the original inequality to determine the solution set.
  - [Note: You need to consider the end points separately.]

Solve each equation.

1. a) $\left(\sqrt{3x+1}\right)^2 = 4^2$

$3x+1=16$
$-1 \quad -1$
$3x=15$
$\boxed{x=5}$

b) $\sqrt{x-12}-8=0$

$+8 \quad +8$
$\left(\sqrt{x-12}\right)^2 = 8^2$
$x-12=64$
$+12 \quad +12$
$\boxed{x=76}$

2. a) $\sqrt{2y+6}-8=-4$

$+8 \quad +8$
$\left(\sqrt{2y+6}\right)^2 = 4^2$
$2y+6=16$
$-6 \quad -6$
$\frac{2y}{2}=\frac{10}{2}$
$\boxed{y=5}$

b) $\left(\sqrt[3]{m+7}\right)^3 = \left(\sqrt[3]{3m-21}\right)^3$

$m+7=3m-21$
$+21 \quad +21$
$m+28=3m$
$-m \quad -m$
$\frac{28}{2}=\frac{2m}{2}$
$\boxed{m=14}$

3. a) $\left((x+6)^{\frac{2}{3}}\right)^{3/2} = (25)^{3/2}$

$x+6=125$
$-6 \quad -6$
$\boxed{x=119}$

b) $\left((w-8)^{\frac{3}{4}}\right)^{4/3} = (8)^{4/3}$

$w-8=(2^3)^{4/3}$
$w-8=16$
$+8 \quad +8$
$\boxed{w=24}$

4. Solve each inequality and graph the solution set.

a) $x^2-2x-15>0$ $a=1$ $b=-2$ $c=-15$

$x=\frac{-b}{2a}=\frac{2}{2}=1$

$f(1)=1^2-2(1)-15=0$

$f(1)=1-2-15=-16$

sol set $\{x \mid x<-3 \text{ or } x>5\}$

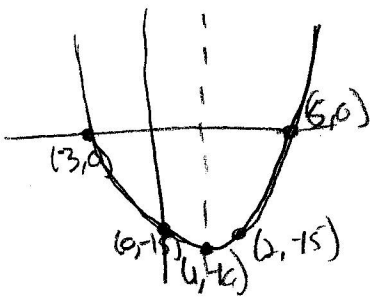
Int not: $(-\infty,-3)\cup(5,\infty)$

vertex $=(1,-16)$

$x^2-2x-15=0$

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

$x=-3 \quad x=5$

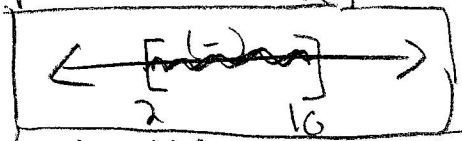


b) $4t^2-48t+80\le 0$

$4(t^2-12t+20)$

$(t-10)(t-2)$

$t=10 \quad t=2$



sol set: $\{t \mid 2\le t\le 10\}$

Int not: $[2,10]$