

5) Gaither - Leto Invitational Algebra II - solutions

B 1.  $5-6-9+10 = -1-9+10 = 0$

B 2.  $(1-\frac{3}{x})^2 = 0 \quad \frac{3}{x} = 1$

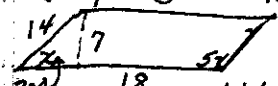
C 3.  $(.9)^x = .5 \quad x = 6$

A 4.  $x(x+1)^2 - (x^2+1)^2 = x(x^2+2x+1) - (x^4+2x^2+1) = -x^4+x^3+x-1 = -x^3(x-1) + (x-1)$   
 $(x-1)(-x^3+1) = (x-1)(1-x^3) = (x-1)(1-x)(1+x+x^2) = -(x-1)^2(x^2+x+1)$

E 5.  $16^x = 2 \cdot 2^{\frac{1}{2}} = 2^{\frac{3}{2}} \quad 2^{4x} = 2^{\frac{3}{2}} \quad x = \frac{3}{8}$

A 6.  $\frac{x^2-1+2(x-1)}{2x^2-2+1} = \frac{x^2+2x-3}{2x^2-1}$

C 7.  $\frac{3-4}{-6-9} = \frac{2}{3} \quad \frac{3-4}{-15} = \frac{2}{3} \quad 9-3y = -30 \quad -3y = -39 \quad y = 13$

B 8.   $6x = 180 \quad x = 30 \quad 7(18) = 126$

D 9.  $\frac{(1+3i)^2}{5-1-3i} = \frac{1+6i+9i^2}{4-3i} = \frac{-8+6i}{4-3i} = \frac{-2(4-3i)}{4-3i} = -2$

C 10.  $x(x+2)+x(x+4)=1508 \quad 2x^2+6x=1508 \quad x^2+3x-1508=0 \quad (x+29)(x-26)=0$   
 $26+28+30=84$

C 11.  $\sqrt{x^2-9}=4 \quad x^2-9=16 \quad x^2=25 \quad x=\pm 5$

Of  $x=1$ , first row equals the second, if  $x=-2$ , second row equal third.

B 12.  $\begin{matrix} -2+1 & = & -1 \\ A(0,4) & & B(4,4) \end{matrix}$

D 13.  $\begin{matrix} 0(0,0) & & C(4,0) \\ \frac{4}{-4} & = & -1 \end{matrix} \quad x+y=4$

D 14.  $\frac{-2 \pm \sqrt{4-4(1)(4)}}{2} = \frac{-2 \pm \sqrt{4-16}}{2} = \frac{-2 \pm \sqrt{-12}}{2} = \frac{-2 \pm 2i\sqrt{3}}{2} = -1 \pm i\sqrt{3}$

C 15.  $x+x+234=13108 \quad 2x=12874 \quad x=6437 \quad N=6671$

C 16.  $\binom{3}{2} \binom{4}{3} = 3 \cdot 4 = 12 \times 5! = 12(120) = 1440$

E 17.  $\binom{7}{3} (x)^4 (-\sqrt{2})^3 = 35x^4 (-2\sqrt{2}) = -70\sqrt{2}x^4$

C 18.  $\frac{2x-2}{2} = \frac{(x-9)^2}{2} \quad 4x-4 = x^2-18x+81 \quad x^2-22x+85=0 \quad x=5 \text{ or } x=17$

A 19.  $g(5) = \sqrt{40} \quad S(\sqrt{40}) = 6$

D 20.  $\frac{n-\sqrt{n+1}}{\sqrt{n+1}} = \frac{n-(n+1)}{\sqrt{n+1}} = \frac{-1}{\sqrt{n+1}} = \frac{-\sqrt{n+1}}{n+1}$

E 21.  $x^2-4 > 5 \quad \text{or } x^2 > 9 \quad |x| > 3 \quad -x^2+4 > 5 \quad -x^2 > 1 \quad x^2 < -1 \quad \emptyset$

B 22.  $x^2+y^2=25 \quad y+13=x^2 \quad y^2+y=+12 \quad y^2+y-12=0 \quad y=-4 \text{ or } 3$

C 23.  $3x=4y \quad x=8+y \quad 24+3y=4y \quad y=24 \quad x=32$

A 24.  $28x = \frac{p}{2} \quad p=56x \quad 11+x = \frac{56x}{4} \quad 11=13x \quad x = \frac{11}{13}$

A 25.  $\begin{bmatrix} \frac{4}{10} & -\frac{1}{10} \\ -\frac{3}{10} & \frac{3}{10} \end{bmatrix} \begin{bmatrix} 5 & 2 \\ 1 & -3 \end{bmatrix} = \begin{bmatrix} \frac{18}{10} & \frac{16}{10} \\ -\frac{11}{10} & -\frac{13}{10} \end{bmatrix} \quad \frac{15}{10}(\frac{-12}{10}) - (\frac{11}{10})(\frac{-2}{10}) = \frac{-247}{100} + \frac{22}{100} = \frac{-170}{100} = \frac{-17}{10}$

A 26.  $y = ax^2 + bx + c \quad n = a+b+c \quad n-a = 2b$   
 $n-a = -6 \quad a = a-b+c \quad -6 = 2b \quad b = -3$

B 27.  $6^{-2} 2^{-1} + 3 = \frac{1}{36} \cdot \frac{1}{2} + 3 = \frac{1}{72} + 3 = \frac{1+3(72)}{72} = \frac{1+216}{72} = \frac{217}{72}$

E 28.  $\frac{1}{2} = a \quad \frac{1}{4} = b \quad a+b = \frac{3}{4} \quad -2a-2b = -\frac{5}{2} \quad b = -\frac{5}{3} \quad 2a-5=0 \quad a = \frac{5}{2} \quad 2a+3b=0 \quad 2a+3(-\frac{5}{3})=0 \quad 2a=5 \quad x = \frac{5}{2} \quad y = -\frac{3}{5}$

A 29.  $1 \cdot 4 \cdot 3 \cdot 2 \cdot 1 \cdot 1 = 24 \quad 24 \div 6! = \frac{1}{30}$

A 30.  $49-36=13 \quad c^2=13 \quad c = \pm\sqrt{13}$