

# Algebra II Individual Solutions

February 5, 1994

1.)  $(x-3)^2 - (2x-5)(x+4) = x^2 - 6x + 9 - (2x^2 + 3x - 20) = -x^2 - 9x + 29$  B

2.)  $c + 0 = c$  additive identity property C

3.)  $|2x+3| \geq \frac{5}{3}$   $2x+3 \geq \frac{5}{3}$  or  $2x+3 \leq -\frac{5}{3}$   $2x \geq \frac{-4}{3}$  or  $2x \leq \frac{-14}{3}$   $x \geq \frac{-2}{3}$  or  $x \leq \frac{-7}{3}$  A

4.)  $f+30g=215$   
 $f+150g=575$   $> 120g=360$   $g=3$   $f+90=215$   $f=125$  C

5.) vertex  $(\frac{3}{4}, \frac{-23}{8})$  Domain: Reals Range:  $\{y: y \leq \frac{-23}{8}\}$  E

6.)  $\frac{-3+2}{-5-6} = \frac{1}{11}$   $y-5 = -11(x-3)$   $y = -11x + 38$  B

7.)  $x=2y$   
 $y=3z$   
 $2x+4y+6z=0$   $x+2y+3z=0$   
 $2y+6z+3z=5$   $6z+6z+3z=5$   $15z=5$   $z=\frac{1}{3}$ ,  $y=1$ ,  $x=2$  D

8.)  $y = x^2 - 6x + 4$  (3, -5) C

9.)  $10x^2 - 18x - 3 = 0$   $(-13)^2 - 4 \cdot 10 \cdot (-3) = 169 + 120 = 289$  D

10.)  $g(3x^2+2) = 2(3x^2+2) - 5 = 6x^2 - 1$  B

11.)  $\frac{(3x-2)(x+3)}{(2x-1)(3x-2)} \cdot \frac{(2x-1)(x+4)}{(3x-1)(x+3)} = \frac{x+4}{3x-1}$  C

12.)  $x = \frac{2y+5}{3}$   $3x = 2y+5$   $y = \frac{3x-5}{2}$  B

13.)  $(3x^2-2)^3 = (3x^2)^3 + 3(3x^2)^2(-2) + 3(3x^2)(-2)^2 + (-2)^3 = 27x^6 - 54x^4 + 36x^2 - 8$  D

14.)  $\sqrt{x^2-25} + 5\sqrt{3} - 2\sqrt{3} - 3 = \sqrt{x^2-25} + 3\sqrt{3} - 3$  D

15.)  $\frac{x^{10}}{x^{1/2}} \cdot \frac{x^{1/5}}{x^{4/3}} = \frac{x^{10}}{x^{7/6}} = \frac{1}{x}$  A

16.)  $8^x = 32$   $(2^3)^x = 2^5$   $3x = 5$   $x = \frac{5}{3}$  D

17.)  $3 = e^{r \cdot 20}$   $\ln 3 = r \cdot 20$   $r = \frac{\ln 3}{20}$   $r = 5.49\%$  C

18.) 4 inequalities B

19.)  $\frac{3+2i}{5-i} \cdot \frac{5+i}{5+i} = \frac{15+13i-2}{25+1} = \frac{13+13i}{26} = \frac{1}{2} + \frac{1}{2}i$  B

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20)  $x = \text{cost}$   
 $y = \text{\# of seats}$

$$xy = 850 \quad (x+20)(y-200) = 1050 \quad (x+2)\left(\frac{850}{x} - 200\right) = 1050$$

$$850 - 200x + \frac{170}{x} - 40 = 1050 \quad -200x^2 - 240x + 170 = 0 \quad 20x^2 + 24x - 17 = 0$$

$$\frac{-24 \pm \sqrt{24^2 - 4 \cdot 20 \cdot (-17)}}{40} \quad , 5, -\cancel{17} \quad , 5y = 800 \quad y = \frac{1700}{1500} \quad C$$

21)  $(4-3i)(5+2i) = 20 - 7i + 6 = 26 - 7i \quad D$

22)  $300 = 203.3e^{.013t}$   
 $\ln\left(\frac{300}{203.3}\right) = t \cdot .013$   
 $t = \frac{\ln\left(\frac{300}{203.3}\right)}{.013} = 29.93075031 \approx 29.9 \quad C$

23)  $B^2 - 4AC = 9 - 4 \cdot 2 \cdot 5 = 9 - 40 = -31 < 0$  ellipse  $B$

24)  $x^2 + 8x + 16 + y^2 - 4y + 4 = 8 + 16 + 4$   
 $(x+4)^2 + (y-2)^2 = 28 \quad r = \sqrt{28} = 2\sqrt{7} \quad C$

25) 3)  $\begin{bmatrix} 1 & -7 & 17 & -15 \\ 3 & -12 & 15 \\ 1 & -4 & 5 & 0 \end{bmatrix}$   
 $x^2 - 4x + 5 = 0 \quad \frac{4 \pm \sqrt{16 - 4 \cdot 5}}{2} = \frac{4 \pm \sqrt{4}}{2} = \frac{4 \pm 2}{2} = 2 \pm i \quad C$

26)  $\frac{5(-7)^5 - 4(-7)^4 - 7(-7)^3 + 2(-7) - 8}{(-7-5)(-7+3)(-7-2)} = 211.25 \quad C$

27)  $\frac{1}{3x+2} + \frac{2x}{2x+5} - x = \frac{2x+5+6x^2+4x-x(6x^2+19x+10)}{(3x+2)(2x+5)} = \frac{-6x^3-13x^2-4x+5}{(3x+2)(2x+5)} \quad A$

28)  $6x^2 - 11x - 35 = (3x+5)(2x-7) \quad B$

29)  $\begin{bmatrix} 1 & -1 & 2 \\ 2 & 0 & 3 \\ -2 & -1 & 3 \end{bmatrix} \begin{bmatrix} -3 \\ 2 \\ 1 \end{bmatrix} = \begin{bmatrix} -3 \\ -3 \\ 7 \end{bmatrix} \quad B$

30)  $\begin{bmatrix} 7 & 5 \\ 4 & 3 \end{bmatrix}$  det. 81 inverse is  $\begin{bmatrix} 3 & -5 \\ -4 & 7 \end{bmatrix} \quad D$