Sections 7.1 – 7.3 Homework

Name: KEY

Solve the systems algebraically:

1) $2x-y=3$
$4x+3y=21$

$y=2x-3$
$4x+3(2x-3)=21$
$4x+6x-9=21$
$10x=30$
$x=3$
$y=2(3)-3=3$

$(3,3)$

2) $3x+2y=3$
$6x+4y=14$

$6x+4y=6$
$6x+4y=14$
$0=-8$

no soln!

3) $5x+y=10$
$2x+0.4y=4$

$y=10-5x$
$2x+.4(10-5x)=4$
$2x+4-2x=4$
$0=0$

infinite solns!

4) $2x+4y-z=1$ (A)
$2x-4y+2z=-6$ (B)
$x+4y+z=0$

$z=2x+4y-1$
(A) $2x-4y+2(2x+4y-1)=-6$
$2x-4y+4x+8y-2=-6$
$6x+4y=-4$ ⟶ $6x+4y=-4$
(B) $x+4y+(2x+4y-1)=0$ ⟶ $-(6x+16y=2)$ (×2)
$3x+8y=1$
$-12y=-6$
$y=\frac{1}{2}$
$x=-1$

$z=2(-1)+4(\frac{1}{2})-1=-1$

$(-1, \frac{1}{2}, -1)$

5) $2x+y+3z=1$
(A) $2x+6y+8z=3$
(B) $6x+8y+18z=5$

$\rightarrow y = 1-2x-3z$

(A) $2x+6(1-2x-3z)+8z=3$
$2x+6-12x-18z+8z=3$
$-10x-10z=-3$

(B) $6x+8(1-2x-3z)+18z=5$
$6x+8-16x-24z+18z=5$
$-10x-6z=-3$

$-(-10x-10z=-3)$

$4z=0$
$z=0$
$x=3/10$

$y=1-2(\frac{3}{10})-0$
$=\frac{2}{5}$

$(\frac{3}{10}, \frac{2}{5}, 0)$

6) A small corporation borrowed $800,000 to expand its line of toys. Some of the money was borrowed at 8%, some at 9%, and some at 10%. How much borrowed at each rate if the annual interest owed was $67,000 and the amount borrowed at 8% was five times the amount borrowed at 10%?

$x+y+z = 800{,}000$
$.08x+.09y+.1z = 67{,}000$
$5z=x$

$6z+y = 800{,}000$ $\quad y = 800{,}000-6z$
$.5z+.09y = 67{,}000$

$.5z+.09(800{,}000-6z)=67{,}000$
$.5z+72{,}000-.54z=67{,}000$
$5000=.04z$

$\$125{,}000 = z$
$x=\$625{,}000$
$y=800000-625000-125000=\$50{,}000$

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7) A department store held a sale to sell all of the 214 winter jackets that remained at the end of the season. Until noon, each jacket was priced at \$31.95. At noon, the price of jackets was further reduced to \$18.95. After the last jacket was sold, total receipts for the clearance sale were \$5108.30. How many jackets were sold before noon? How many were sold after noon?

$x + y = 214 \quad \rightarrow y = 214 - x$

$31.95x + 18.95y = 5108.30$

$31.95x + 18.95(214 - x) = 5108.3$

$31.95x + 4055.3 - 18.95x = 5108.3$

$13x = 1053$

$x = 81$ before noon

$y = 214 - 81 = 133$ after noon