Sections 7.1 – 7.3 I.C.E Name: KEY

For 1 – 4, solve the system algebraically (Substitution or Elimination).

1) $x+2y=1$
$5x-4y=-23$

$\rightarrow x = 1-2y$

$5(1-2y)-4y = -23$

$5-10y-4y = -23$

$28 = 14y$

$2 = y$

$x = 1-2(2) = -3$

$(-3, 2)$

2) $x-y=3$
$x-y^2=1$

$\rightarrow x = y+3$

$y+3-y^2 = 1$

$y^2-y-2=0$

$(y+1)(y-2)=0$

$y = -1, 2$

$x = 2, 5$

$(2, -1)$
$(5, 2)$

3) $2x-y+3=0$
$x^2+y^2-4x=0$

$\rightarrow y = 2x+3$

$x^2+(2x+3)^2-4x=0$

$x^2+4x^2+12x+9-4x=0$

$5x^2+8x+9=0$

$\frac{-8 \pm \sqrt{64-4(5)(9)}}{2(5)} = \frac{-8 \pm \sqrt{-34}}{10}$

No real solns!

4) $2x+y-z=7$
(A) $x-2y+2z=-9$
(B) $3x-y+z=5$

$\rightarrow z = 2x+y-7$

(A) $x-2y+2(2x+y-7) = -9$

$x-2y+4x+2y-14 = -9$

$5x = 5$

$x = 1$

(B) $3x-y+(2x+y-7) = 5$

$5x = 12$

$x = \frac{12}{5}$

No solution!

Sections 7.1 – 7.3 I.C.E

You can choose any method to solve the problems below- just define your variables, set up two or three equations, and then solve by the method of your choosing.

5) A total of $32,000 is invested in two municipal bonds that pay 5.75% and 6.25% simple interest. The investor wants an annual interest income of $1900 from the investments. How much should be invested in each type of bond?

$.0575x + .0625y = 1900$

$x + y = 32000 \rightarrow x = 32000 - y$

$.0575(32000 - y) + .0625y = 1900$

$1840 - .0575y + .0625y = 1900$

$.005y = 60$

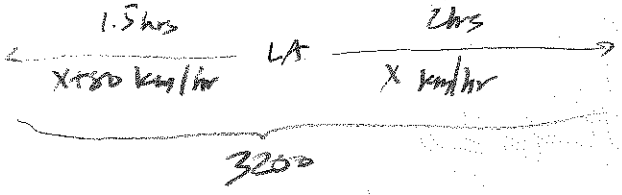
$y = 12000$

$x = 20000$

$20,000 @ 5.75$

$12,000 @ 6.25$

6) Two planes start from LA International Airport and fly in opposite directions. The second plane starts one half hour after the first plane, but is speed is 80 km/hr faster. Find the airspeed of each plane if 2 hours after the first plane departs, the planes are 3200 km apart.



$3200 = x \cdot 2hrs + (x+80)1.5hrs$

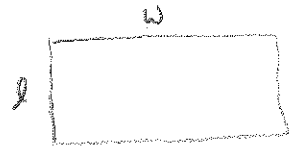
$3200 = 2x + 1.5x + 120$

$3080 = 3.5x$

$880 km/hr = x$

$y = 880 + 80 = 960 km/hr$

7) What are the dimensions of a rectangular tract of land if its perimeter is 40 kilometers and its area is 96 square kilometers?



$lw = 96$

$2(l + w) = 40$

$2l + 2w = 40$

$l + w = 20$

$l = 20 - w$

$\therefore (20 - w)w = 96$

$20w - w^2 = 96$

$w^2 - 20w + 96 = 0$

$(w - 8)(w - 12) = 0$

$w = 8, 12$

$l = 12, 8$

$8 \times 12 km$

8) Ten liters of a 30% acid solution is obtained by mixing a 20% solution with a 50% solution. How much of each solution is required to obtain the specified concentration of the final mixture?

$.2x + .5y = .3(10)$

$x + y = 10 \rightarrow x = 10 - y$

$.2(10-y) + .5y = 3$

$2 - .2y + .5y = 3$

$.3y = 1$

$\rightarrow y = \frac{10}{3}$ litres

$\rightarrow x = \frac{20}{3}$ litres

9) In Super Bowl I, the Green Bay Packers defeated the Kansas City Chiefs by a score of 35 to 10. The total points scored came from 13 different scoring plays, which were a combination of touchdowns, extra-point kicks, and field goals, worth 6, 1, and 3 points respectively. The same number of touchdowns and extra point kicks were scored. There were six times as many touchdowns as field goals. How many touchdowns, extra-point kicks, and field goals were scored during the game?

$T + F + E = 13$

$T = E$

$6F = T$

$6F + F + 6F = 13$

$13F = 13$

$F = 1$

$T = 6$

$E = 6$