8.2 HW Pg. 270-271 #1-8, 10

For Exercises 1–4, use the substitution method to solve the system of equations. Identify any system that is inconsistent.

1. $x - y = 2$
$2x + 3y = 9$

$x = y + 2$
$2(y+2) + 3y = 9$
$2y + 4 + 3y = 9$
$5y = 5$
$y = 1$
$x = 3$
$(3, 1)$

2. $2x = 3y + 19$
$4x - y = 13$

$-y = -4x + 13$
$y = 4x - 13$
$2x = 3(4x - 13) + 19$
$2x = 12x - 39 + 19$
$-10x = -20$
$x = 2$
$y = 4(2) - 13$
$y = -5$
$(2, -5)$

3. $5x - y = 20$
$2y = 10x - 8$

$y = 5x - 4$
$5x - (5x - 4) = 20$
$5x - 5x + 4 = 20$
$4 \neq 20$
inconsistent

4. $5x = 4y - 26$
$3x + 2y = 2$

$2y = -3x + 2$
$y = -\frac{3}{2}x + 1$
$5x = 4\left(-\frac{3}{2}x + 1\right) - 26$
$5x = -6x + 4 - 26$
$11x = -22$
$x = -2$
$y = -\frac{3}{2}(-2) + 1$
$y = 4$
$(-2, 4)$

5. A coffee shop sells several different kinds of coffee. The shop also uses some of its coffees to make its own custom blends. Coffee A sells for \$6.00 a pound. Coffee B sells for \$10.00 a pound. The shop's manager wants to create a blend of types A and B that sells for \$7.00 a pound. The manager wants to make 10 pounds of this blend.

a. Write an equation that models the total number of pounds of coffees A and B in the blend. Use a to represent the number of pounds of coffee A used in the blend. Use b for the number of pounds of coffee B used in the blend.

$a + b = 10$

b. What is the total dollar value of the 10 pounds of blended coffees?

\$70

c. Write an equation that represents this total dollar value in terms of a and b.

$6a + 10b = 70$

d. What is the number of pounds of each coffee in 10 pounds of the blend?

$\begin{cases} a + b = 10 \\ 6a + 10b = 70 \end{cases}$

$a = -b + 10$
$a = -2.5 + 10$

$6(-b + 10) + 10b = 70$
$-6b + 60 + 10b = 70$
$4b = 10$
$b = 2.5$

7.5 lbs of coffee A
2.5 lbs of coffee B

6. A young woman is saving money to buy a used car. The price of the car is \$5,525, but it will be reduced by \$150 for each month that the car remains unsold. She currently has \$3,250 in her savings account and will be able to save an additional \$175 each month.

a. Write an equation that models the price in dollars d of the car after n months.

$d = -150n + 5{,}525$

b. Write an equation that models the number of dollars d the woman will have saved after n months.

$d = 175n + 3250$

c. Determine the number of months until the woman can buy the car.

$175n + 3250 = -150n + 5525$
$325n = 2275$
$n = 7$
7 months

d. Explain how you could use a graph to solve this problem.

d) You could graph $d = -150n + 5525$ and $d = 175n + 3250$ on the same axes. Find the point of intersection.

e. Explain how you could use a table to solve this problem.

The coordinates of that point (n,d) are the solution to the problem.

e) Make a table of n and d values for $d=-150n+5625$ and $d=175n+3250$. Examine the tables to find a value of n for which the d-values are identical in both table. The common (n,d) pair is the solution to the problem.

7. The promotions manager for a baseball team is planning a special opening day giveaway. Each of the first 5,000 fans will receive either a souvenir cap or a blanket with the team logo. The manager knows that the caps cost $5 each and the blankets cost $12 each. The amount to be spent on purchasing the caps and blankets is $32,000.

a. Write a system of equations that models this situation. Let c represent the number of caps. Let b represent the number of blankets.

b. Solve the system algebraically.

c. Use a graph to solve the system.

d. Use a table to solve the system.

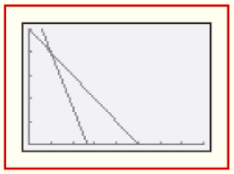
e. How many caps and blankets should be purchased?

1000 blankets
4000 caps

(b) $c+b=5{,}000 \rightarrow c=-b+5000$
$5c+12b=32{,}000$

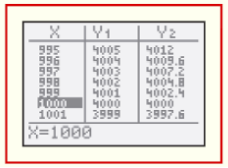
$5(-b+5000)+12b=32{,}000$
$-5b+25{,}000+12b=32{,}000$
$7b=7000$
$b=1000$
$c=4000$

(c) y_1: $c=-b+5000$
y_2: $c=-12/5b+6400$



[0, 8000] × [0, 5000]

(d)



8. An order of smartphones and MP3 players totals $4,003 without any taxes or other charges. The cost of each smartphone is $194.50, and the cost of each MP3 player is $159.50. The shipment contains a total of 24 devices. How many of each device is in the order?

s = # of smartphones
m = MP3 players

$s+m=24 \rightarrow s=-m+24$
$194.50s+159.50m=4003$
$194.50(-m+24)+159.50m=4003$
$-194.50m+4668+159.50m=4003$
$-35m=-665$
$m=19$ so $s=5$

5 smartphones
19 mp3 players

10. A car share company's "occasional driving" plan has a $50 annual fee and charges $8 per hour for a car. Another plan from the same company has a monthly fee of $50 but charges only $7.20 per hour.

a. How many hours of driving in a year would result in equal total costs for both plans?

b. If you use a car for 200 hours in a year, which plan is the better deal?

T = total cost
h = # of hours

$T=8h+50$
$T=7.20h+50(12)$
$8h+50=7.20h+600$
$.8h=550$
$h=687.5$
$T=5{,}550$

a) For 687.5 hours, both plans cost $5,550.

b) The first plan with the annual fee is the better deal for any # of hours less than 687.5 hours.