Problem 1. Solve the following systems by substitution:

(a)
$$3x + 4y = 4$$
$$x - y = 13$$
(b)
$$4x - 5y = -11$$
$$2x + y = 5$$
$$4y = 2x - 4$$
(c)
$$x - y = 4$$

Problem 2. Solve the following systems by elimination:

(a)
$$4x + y = -23 x - 2y = -17 4x + 3y = -1 (b)
$$4x + 3y = -1 2x + 5y = 3 (c)
$$5x + 4y = -2 4x - 5y = 23 3x + 2y = 5 6x + 4y = 8 (d)
$$3x + 5y = -2 9x + 15y = -6$$$$$$$$

Problem 3. A ranch sells 6 goats and 5 sheep for \$305, while 2 goats and 9 sheep sell for \$285. Find the cost of a single goat and of a single sheep.

Problem 4. A cashier has a total of 30 bills, made up of ones, fives, and twenties. The number of twenties is 9 more than the number of ones. The total value of the money is \$351. How many of each denomination of bill are there?

Problem 5. You win \$2,000 in the Florida state lottery. You invest part of the money in real estate with an annual return of 3% and another part in a money market account at 2.5% interest. You invest the rest, which amounts to \$800 less than the sum of the other two parts, in certificates of deposit that pay 1.5%. If the total annual interest rate on the money is \$49, how much was invested at each rate?

Answers:

1. (a)
$$(8, -5)$$
; (b) $(1, 3)$; (c) $(6, 2)$.
2. (a) $(-7, 5)$; (b) $(-1, 1)$; (c) $(2, -3)$; (d) \emptyset ; (e) $\left(x, -\frac{3}{5}x - \frac{2}{5}\right)$.

- 3. goat: \$30, sheep: \$25
- 4. 6 ones, 9 fives, and 15 twenties
- 5. 1000 in real estate, 400 in money market, 600 in CDs.