

2.5 (cont)

Ex 2 (#14) A grocer is going to mix three kinds of nuts to make 40 pounds of a mixture that will be priced at \$5.95/lb. The three kinds of nuts are peanuts priced at \$4.00/lb, cashews at \$6.60/lb and pistachios at \$8.20/lb. The mixture will contain twice as much in peanuts as cashews by weight. How many pounds of each nut are in the mix?

	price/lb	# lbs	total price
peanuts	4.00	2c	4(2c)
cashews	6.60	c	6.6c
pistachios	8.20	p	8.2p
mix	5.95	40	5.95(40)

$$\textcircled{1} 2c + c + p = 40$$

$$\textcircled{2} 8c + 6.6c + 8.2p = 5.95(40)$$

$$\Leftrightarrow \textcircled{1} p = 40 - 3c$$

$$\textcircled{2} 14.6c + 8.2p = 238$$

$$14.6c + 8.2(40 - 3c) = 238$$

$$14.6c + 328 - 24.6c = 238$$

$$-10c = -90$$

$$c = 9$$

$$\Rightarrow p = 40 - 3(9) = 40 - 27 = 13$$

\Rightarrow 13 lbs pistachios, 9 lbs cashews, 18 lbs peanuts

2.5 (cont)

Ex 3 (#22) A company needs to borrow \$150,000. For tax & related reasons, the company wants to pay 7.3% interest on this loan. There are three lenders for this money. The first charges 6%, the second charges 7% and the third charges 10%. The company is going to borrow twice as much from the first lender as from the third. How much should the company borrow from each lender?

$x =$ amt \$ borrowed at 6%
 $y =$ " " " 7%
 $z =$ " " " 10%

Equations

$$\textcircled{1} \quad x + y + z = 150000$$

$$\textcircled{2} \quad 2x = z \quad \Leftrightarrow \quad 2x - z = 0$$

$$\textcircled{3} \quad 0.06x + 0.07y + 0.1z = 0.073(150000) \\ \Leftrightarrow \quad 6x + 7y + 10z = 1095000$$

$$\begin{array}{l} \textcircled{2} - \textcircled{1} \\ \textcircled{3} \end{array} \rightarrow \left[\begin{array}{ccc|c} 1 & 1 & 1 & 150000 \\ 2 & 0 & -1 & 0 \\ 6 & 7 & 10 & 1095000 \end{array} \right] \rightarrow \left[\begin{array}{ccc|c} 1 & 1 & 1 & 150000 \\ 0 & -2 & -3 & -300000 \\ 0 & 1 & 4 & 195000 \end{array} \right]$$

$$\begin{array}{l} (\frac{1}{3}) \\ \textcircled{2} \end{array} \left[\begin{array}{ccc|c} 1 & 1 & 1 & 150000 \\ 0 & 0 & 5 & 90000 \\ 0 & 1 & 4 & 195000 \end{array} \right] \quad \begin{array}{l} \textcircled{4} \\ \textcircled{5} \end{array} \left[\begin{array}{ccc|c} 1 & 1 & 1 & 150000 \\ 0 & 0 & 1 & 18000 \\ 0 & 1 & 4 & 195000 \end{array} \right]$$

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 150000 \\ 0 & 0 & 1 & 18000 \\ 0 & 1 & 0 & 123000 \end{array} \right]$$

$$\Rightarrow \begin{cases} y = \$123000 \\ z = \$18000 \end{cases}$$

$$\Rightarrow 2x = 18000$$

$$\Rightarrow x = \$9000$$