

Applications of Linear Systems:
Percent/Mixture Problems (Chapter 1)

Assigned Work:

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p. 39 # 11
p. 55# 10, 12

Feb 16-9:58 AM

Applications of Linear Systems:
Percent/Mixture Problems

Feb 22/2016

Assigned Work: p. 27 # 7 p. 39 # 11 p. 55 # 10, 12

1. Percentages can be expressed as a fraction or a decimal.

$$25\% = \frac{25}{100} = 0.25$$

2. Use the wording of the question to help you choose your unknowns (variables).
3. Make sure your units are consistent.

Feb 19-10:00 PM

Ex. 1) One type of granola is 30% fruit, and another type is 15% fruit. What mass of each type of granola should be mixed to make 600 g of granola that is 21% fruit?

$$\text{amount 1} + \text{amount 2} = \text{total amount}$$

$$m_1 + m_2 = 600 \quad (1)$$

$$\begin{array}{l} \text{amount or} \\ \text{cost of} \\ \text{component 1} \end{array} + \begin{array}{l} \text{amount or} \\ \text{cost of} \\ \text{component 2} \end{array} = \begin{array}{l} \text{amount or} \\ \text{cost of} \\ \text{total.} \end{array}$$

$$0.30 m_1 + 0.15 m_2 = 0.21(600) \quad (2)$$

↑
↑
↑

% of fruit
mass of granola 1
%

Feb 19-10:00 PM

Copy and try this!

Ex. 2) A chemistry teacher needs to make 10 L of 42% sulphuric acid solution. The acid solutions available are 30% sulphuric acid and 50% sulphuric acid, by volume. How many litres of each solution must be mixed to make the 42% solution?

$$V_1 + V_2 = 10 \quad (1)$$

$$0.30V_1 + 0.50V_2 = 0.42(10) \quad (2)$$

$$0.3V_1 + 0.5V_2 = 4.2 \quad [\times 10]$$

$$3V_1 + 5V_2 = 42 \quad (3)$$

$$(1) \times 3: 3V_1 + 3V_2 = 30 \quad (4)$$

$$(3) - (4) \quad \frac{2V_2}{2} = \frac{12}{2}$$

$$\boxed{V_2 = 6}$$

Sub $V_2 = 6$ into (1): $V_1 + V_2 = 10$

$$V_1 + (6) = 10$$

$$\boxed{V_1 = 4}$$

\therefore combine 6L of 50% with 4L of 30%.

Feb 19-10:00 PM

Try this!

Ex. 3) A candy store is preparing a mixture of chocolate raisins and chocolate peanuts. The raisins sell for \$2.22/kg and the peanuts for \$1.75/kg. How much of each type must be mixed to make 20 kg of a mixture that will sell for \$41?

$$m_1 + m_2 = 20 \text{ kg} \quad (1)$$

where m_1 is mass of raisins
 m_2 is mass of peanuts

$$2.22m_1 + 1.75m_2 = 41 \quad (2)$$

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Assigned Work:

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$$7. \quad m_B + m_E = 200 \quad (1)$$

$$12m_B + 17m_E = 15(200) \quad (2)$$

$$12m_B + 17m_E = 3000$$

$$(1) \times 12: \quad 12m_B + 12m_E = 2400 \quad (3)$$

$$\text{Sub:} \quad \begin{array}{r} 5m_E = 600 \\ \underline{5} \\ m_E = 120 \end{array}$$

Sub $m_E = 120$ into (1)

$$m_B + (120) = 200$$

$$m_B = 80$$

\therefore mix 120 kg of
 Ethiopian and
 80 kg of Brazilian.

Feb 17 - 9:56 AM

p. 39 #11.

Let m_1 rep. 88% silver, m_2 is 66% silver

$$m_1 + m_2 = 30 \quad (1)$$

$$0.88m_1 + 0.66m_2 = 0.70(30) \quad (2)$$

pure silver

$$0.88m_1 + 0.66m_2 = 21 \quad [\times 100]$$

$$88m_1 + 66m_2 = 2100 \quad [\div 2]$$

$$44m_1 + 33m_2 = 1050 \quad (3)$$

$$\textcircled{1} \times 40: 40m_1 + 40m_2 = 1200 \quad (4)$$

$$\text{Sub:} \quad \begin{array}{r} -7m_2 = -150 \\ \underline{-7} \quad \underline{-7} \end{array}$$

$$m_2 = 21.4$$

$$m_1 + m_2 = 30$$

$$m_1 + 21.4 = 30$$

$$m_1 = 8.6$$

$$\begin{array}{l} \approx \\ = \end{array} \left. \begin{array}{l} \text{approx.} \\ \text{equal} \\ \text{to} \end{array} \right\}$$

Feb 23-2:10 PM

p. 55 #10.

$$\begin{array}{ccc} m_1 & + & m_2 & = & 500 & (1) \\ 99\% & & 70\% & & 86\% \end{array}$$

$$0.99m_1 + 0.70m_2 = 0.86(500) \quad (2)$$

$$0.99m_1 + 0.70m_2 = 430$$

$$99m_1 + 70m_2 = 43000$$

Feb 23-2:23 PM

p 55 #12.

m_1 oranges, m_2 tomatoes

$$0.26 m_1 + 0.13 m_2 = 13 \text{ ① (vit C)}$$

$$0.13 m_1 + 0.42 m_2 = 20.7 \text{ ② (vit A)}$$

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