

Word Problems

Ex/ John has a total of 23 loonies and toonies. If he has \$33 in total, how many of each does he have?

let x = number of loonies
 y = number of toonies

$$\begin{aligned} x+y &= 23 \\ 1x+2y &= 33 \\ \hline -1y &= -10 \\ y &= 10 \end{aligned}$$

$$\begin{aligned} x+y &= 23 \\ x+10 &= 23 \\ x &= 13 \end{aligned}$$



∴ There are 13 loonies and 10 toonies.

Ex/ Ruth runs at 4 m/s over flat land and 3 m/s over rough terrain. On Saturday, she ran 3000 m in 13 minutes over rough and flat terrain. What distance did she run over flat ground?



	D	s	t
flat	4x	4	x
rough	3y	3	y
total	3000		780

13 min = 13(60) seconds

$$\begin{aligned} x+y &= 780 \\ 4x+3y &= 3000 \end{aligned}$$

$$\begin{aligned} 4x+4y &= 3120 \\ 4x+3y &= 3000 \\ \hline y &= 120 \end{aligned}$$

$$\begin{aligned} x+y &= 780 \\ x+120 &= 780 \\ x &= 660 \end{aligned}$$

∴ Flat distance = $4x$
 $= 4(660)$
 $= 2640$ m

Ex/ The student council is selling t-shirts. The cost of t-shirts includes an \$800 design and set-up charge plus \$4 per t-shirt. The shirts will sell for \$20 each. How many t-shirts does the student council need to sell to break even?

let x = number of t-shirts
 y = value

$$\begin{aligned} \text{Cost: } y &= 800 + 4x \\ \text{Earnings: } y &= 20x \end{aligned}$$

$$\begin{aligned} y &= y \\ 800+4x &= 20x \\ 800 &= 20x-4x \\ 800 &= 16x \\ x &= 50 \end{aligned}$$

∴ They will break even if 50 t-shirts are sold.

Ex/ A cleaner containing 20% ammonia is mixed with another cleaner containing 10% ammonia to dilute its strength. If 100 L of this new 17% ammonia mixture is obtained, how much of each cleaner was used?

let x = L at 20%
 y = L at 10%

$$\begin{aligned} x+y &= 100 \\ 0.2x+0.1y &= 0.17(100) \end{aligned}$$

$$\begin{aligned} 0.2x+0.2y &= 20 \\ 0.2x+0.1y &= 17 \\ \hline 0.1y &= 3 \\ y &= 30 \end{aligned}$$



∴ Need 70 L of the 20% and 30 L of the 10%

$$\begin{aligned} x+y &= 100 \\ x+30 &= 100 \\ x &= 70 \end{aligned}$$

homework: Pg. 39
 Pg. 54

#s: 7,8,11,12,15,17
 #s: 10

