

S 4.3 #s 1, 6, 8, 12, 20, 23, 27, 38

→ Setup only

099-Fall-10

1. One number is two more than a second number. Twice the first is 4 less than 3 times the second. Find the numbers.

Let $x = 1^{st}$ number

$y = 2^{nd}$..

$$\Rightarrow 2y + 4 = 3y - 4$$

Then $x = y + 2$

$$\Rightarrow -y = -8$$

and $2x = 3y - 4$

$$\Rightarrow y = 8$$

$$\Rightarrow 2(y + 2) = 3y - 4$$

$$\Rightarrow x = 8 + 2 = 10$$

$$x = 10$$

$$(x, y) = (10, 8)$$

6. During a multi-day camping trip, Terry Watkins rowed 17 hours downstream. It took 26.5 hours rowing upstream to travel the same distance. If the speed of the current is 6.8 kilometers per hour less than his rowing speed in still water, find his rowing speed and the speed of the current.

Let $r = \text{speed of boat in still water } \left(\frac{\text{km}}{\text{hr}}\right)$

$c = \text{ " of current}$

Distance Rate Time

$$D = rt$$

D $r + c$ 17 hrs

D $r - c$ 26.5 hrs

$$\overset{D}{(r + c)(17)} = \overset{D}{(r - c)(26.5)}$$

$$c = r - 6.8 \Rightarrow$$

$$(r + (r - 6.8))(17) = (r - (r - 6.8))(26.5)$$

$$(2r - 6.8)(17) = (6.8)(26.5)$$

099 \$4.3 cut/d

⑥ cut/d :

$$34r - 115.6 = 180.2$$

$$340r - 1156 = 1802$$

$$340r = 1802 + 1156$$

$$340r = 2958$$

$$r = \frac{2958}{340} = \boxed{8.7 \frac{\text{km}}{\text{hr}} = r}$$

$$\Rightarrow c = 8.7 - 6.8 = \boxed{1.9 \frac{\text{km}}{\text{hr}} = c}$$

$$\begin{array}{r} 6.8 \\ 17 \\ \hline 1476 \\ 680 \\ \hline 1156 \end{array}$$

$$\begin{array}{r} 3 \overline{) 26.5} \\ \underline{6.8} \\ 2120 \\ \underline{15900} \\ 18020 \end{array}$$

8. A pharmacist needs 500 milliliters of a 20% phenobarbital solution but has only 5% and 25% phenobarbital solutions available. Find how many milliliters of each he should mix to get the desired solution.

Let x = the # of milliliters of 5% soln

y = " " " " " 25% soln

want 500 ml of 20% soln.

Volume $x + y = 500$

Pure Pheno-
Barbital $.05x + .25y = (.20)(500)$

$$5x + 12500 - 25x = 10000$$

$$y = 500 - x$$

$$-20x = -2500$$

$$5x + 25(500 - x) = 20(500)$$

$$x = \frac{-2500}{-20}$$

$$= \boxed{125 \text{ ml} = x}$$

12. Hilton University Drama Club sold 311 tickets for a play.

Student tickets cost 50 cents each; nonstudent tickets cost \$1.50. If total receipts were \$385.50, find how many tickets of each type were sold.

$$\boxed{y = 375 \text{ ml}}$$

Let x = # of nonstudent tickets

y = " " student tickets

Total Sold $x + y = 311$

Total Revenue $1.5x + .5y = 385.50$

$$\Rightarrow \Rightarrow \Rightarrow \boxed{\begin{matrix} x = 230 \\ y = 81 \end{matrix}}$$

20. Two cyclists start at the same point and travel in opposite directions. One travels 4 mph faster than the other. In 4 hours they are 112 miles apart. Find how fast each is traveling.

Dist.	Rate	Time
$4(r+4)$	$r+4$	4
$4r$	r	4

Total Distance:

$$4(r+4) + 4r = 112$$

$$4r + 16 + 4r = 112$$

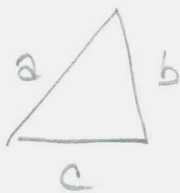
$$8r + 16 = 112$$

$$8r = 96$$

$$r = \frac{96}{8} = 12 \Rightarrow r+4 = 16$$

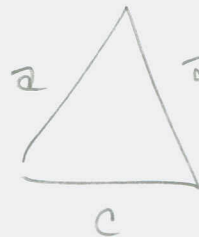
Let
 $r =$ speed of faster cyclist ($\frac{\text{mi}}{\text{hr}}$)

23. The perimeter of a triangle is 93 centimeters. If two sides are equally long and the third side is 9 centimeters longer than the others, find the lengths of the three sides.



$$a + b + c = 93$$

$$c = a + 9$$



$$2a + c = 93$$

Let $a =$ length of one side (cm)

$b =$ " " 2nd " " "

$c =$ " " 3rd " " "

$$2a + a + 9 = 93$$

$$3a + 9 = 93$$

$$3a = 84$$

$$a = \frac{84}{3} = 28$$

$$a = b = 28 \text{ cm}$$

$$c = 28 + 9 = 37 \text{ cm} = c$$

37. Rabbits in a lab are to be kept on a strict daily diet that includes 30 grams of protein, 16 grams of fat, and 24 grams of carbohydrates. The scientist has only three food mixes available with the following grams of nutrients per unit.

	<i>Protein</i>	<i>Fat</i>	<i>Carbohydrate</i>
Mix A	4	6	3
Mix B	6	1	2
Mix C	4	1	12

Find how many units of each mix are needed daily to meet each rabbit's dietary need.

Set up in lecture -

$$\text{Protein } 4x + 6y + 4z = 30$$

$$\text{Fat } 6x + 1y + 1z = 16$$

$$\text{Carbs } 3x + 2y + 12z = 24$$

$x =$ # of grams of Mix A

$y =$ " " " " " B

$z =$ " " " " " C

38. Gerry Gundersen mixes different solutions with concentrations of 25%, 40%, and 50% to get 200 liters of a 32% solution. If he uses twice as much of the 25% solution as of the 40% solution, find how many liters of each kind he uses.

$x = \#$ of liters of 25% soln

$y =$ " " " " 40% "

$z =$ " " " " 50% "

wants 200 l of 32%

Uses twice as much 25% as 40%

$$x + y + z = 200$$

$$.25x + .4y + .5z = (.32)(200)$$

$$x = 2y$$