Section 2.3: cont'd

we went over the Strategies sheet

now let's do a full example:

Find three consecutive even integers whose sum is 60.

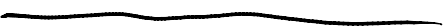let b = first integer
$b+2$ = second integer
$b+4$ = third "

$$b + (b+2) + (b+4) = 60$$

$$3b + 6 = 60$$
$$3b = 54$$
$$b = 18$$

The integers are 18, 20, and 22.

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let's do a bit of work on step 3: variable declaration

examples: write variable declarations for the following statements

① Consider two consecutive even numbers

let n = first number
$n+2$ = second "

② Consider two numbers whose sum is 5

$$\text{let } m = \text{first number}$$
$$5-m = \text{second "}$$

③ Consider a rectangle in which the length is three times the width

$$\text{let } w = \text{width}$$
$$3w = \text{length}$$

④ Consider a rectangle in which the length is 4m less than twice the width

$$\text{let } w = \text{width}$$
$$2w - 4 = \text{length}$$

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types of problems:

uniform motion   (constant speed)

$$d = r \underset{\uparrow}{t} \leftarrow \text{time}$$
$$\underset{\text{distance}}{\uparrow} \quad \underset{\text{rate}}{\uparrow}$$

(in physics: $d = vt$)

simple interest

$$I = P r t$$
$$\underset{\text{interest}}{\nearrow} \quad \uparrow \quad \overset{\leftarrow \text{rate}}{\underset{\text{time}}{\curvearrowright}}$$

interest ′ |↑   `time
                principal

geometry   (see handout from 2.2)

mixture

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full word problem :

Louise walked for two hours and then ran for $1\frac{1}{2}$ hours. If she runs twice as fast as she walks, and the total trip was 20 km, then how fast does she run?

	d	=	r	·	t
walk	$2r$	=	r	·	2
	$+$				
run	$1.5(2r)$	=	$2r$		1.5
	$=$				
total	20				

$$2r + 1.5(2r) = 20$$
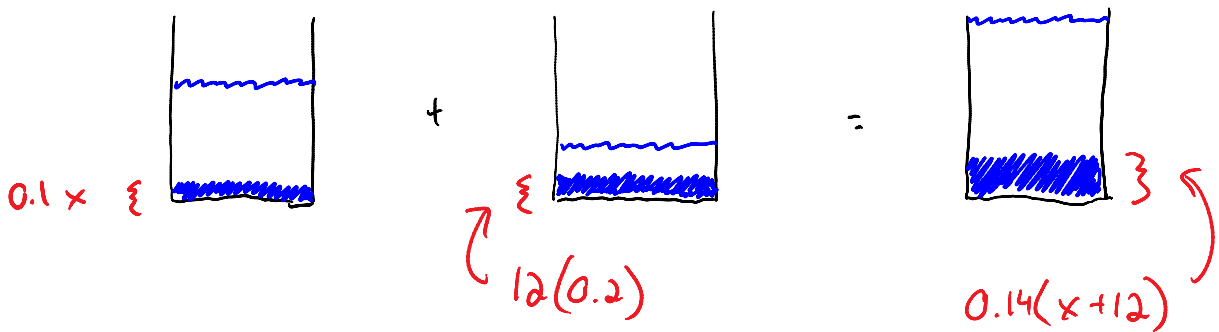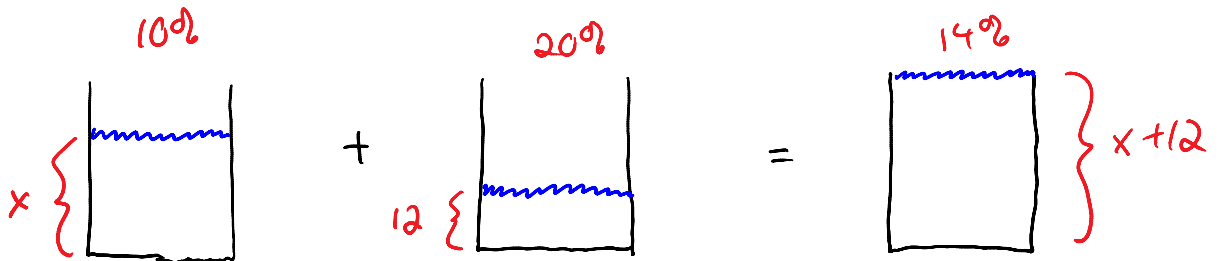$$2r + 3r = 20$$
$$5r = 20$$
$$r = 4$$

Louise runs at 8 km/h.

simple interest — problem on web

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mixture problems

→ adding x litres of a 10% acid solution to
12 litres of a 20% acid solution
→ 14% acid solution

10%   20%   14%

x {   12 {   } $x + 12$

$+$ $=$

$0.1x$ {   { $12(0.2)$ } $0.14(x+12)$

How many litres of 10% acid solution should
be mixed with 12 litres of 20% acid solution
to obtain a 14% acid solution?

	amount of acid	$=$	% acid	$\times$	total volume
10%	$0.1x$		0.1		x
	$+$				$+$

10%	$0.1x$	0.1	x
	$+$		$+$
20%	$0.2(12)$	0.2	12
	$=$		$=$
mix	$0.14(x+12)$	0.14	$x+12$

$$100\left[0.1x + 0.2(12)\right] = \left[0.14(x+12)\right] \cdot 100$$

$$10x + 20(12) = 14(x+12)$$

$$10x + 240 = 14x + 168$$

$$72 = 4x$$

$$x = 18$$

$$\begin{array}{r} 14 \\ 12 \\ \hline 28 \end{array}$$

$$\begin{array}{r} 14 \\ \hline 168 \end{array}$$

18 litres are needed.

Max's Famous Teas sells Earl Grey tea for $10 per pound and Orange Pekoe for $8 per pound. How much of each does he need to combine to get 10 lbs of Domestic Blend, which sells for $9.50 per lb?

	Cost	=	Cost/lb	·	number of lbs
EG	$10x$	$=$	10		x
	$+$				
OP	$8(10-x)$	$=$	8		$10-x$
	$=$				
(DB) ...	9.5	$=$	9.5		10

(OB) mix $\bigg|$ $\stackrel{=}{95}$ $\stackrel{'}{=}$ 9.5 $\cdot$ 10

$$10x + 8(10-x) = 95 \qquad \begin{cases} x + y = 10 \\ y = 10 - x \end{cases}$$

$$10x + 80 - 8x = 95$$

$$2x = 15$$

$$x = 7.5$$

Max needs 7.5 lbs of Earl Grey and 2.5 lbs of Orange Pekoe