

①

	distance	speed	time
Hannah	300 km	$x$ km/h	$\frac{300}{x}$
Liam	300 km	$x+30$ km/h	$\frac{300}{x+30}$

$$\frac{300}{x} = \frac{300}{x+30} + \frac{1}{2}$$

$$x = -150, \boxed{x = 120}$$

- Hannah's speed is 120 km/h,
- and Liam's speed is 150 km/h

THINK IT  
THROUGH  
March 14 Soln

②

	time	rate	work
2 pipes	3 hours	$\frac{1}{3}$ tank/hr	1 tank
1 pipe	4 hours	$\frac{1}{4}$ tank/hr	1 tank

let  $t$  be the time it fills a tank

$$\frac{1}{3}t + \frac{1}{4}t = 1$$

$$\frac{7}{12}t = 1$$

$$\boxed{t = \frac{12}{7} = 1.714 \text{ hr.}}$$

③

	distance	speed	time
A $\rightarrow$ B	240 miles	60 mph	?
B $\rightarrow$ A	240 miles	80 mph	?

the two trains travel for ' $t$ ' hours until they meet.

$$(60 + 80)t = 240$$

$$\boxed{t = \frac{240}{140} = \frac{12}{7} \text{ hr.}}$$

④

	work	time	Rate
Group 1	1 job	12 days	$\frac{1 \text{ job}}{12 \text{ days}}$
Group 2	1 job	15 days	$\frac{1 \text{ job}}{15 \text{ days}}$

$$\left(\frac{1}{12} + \frac{1}{15}\right) 6 + \frac{1}{12} t = 1$$

first 6  
days  
@  $\frac{1}{12} + \frac{1}{15}$  job/day

$$t = \frac{6}{5} = 1.2 \text{ days}$$

⑤

	time	work	rate
Contractor A	10 days	1 project	$\frac{1}{10} \frac{\text{pr.}}{\text{d}}$
Contractor B	8 days	1 project	$\frac{1}{8} \frac{\text{pr.}}{\text{d}}$

$$\frac{1}{10} \frac{\text{pr.}}{\text{day}} \times 4 \text{ days} + \frac{1}{8} t = 1$$

$$\frac{4}{10} + \frac{1}{8} t = 1$$

$$\frac{1}{8} t = \frac{6}{10} \quad t = \frac{48}{10} = 4.8 \text{ days}$$

⑥

	price per pand	(pounds) amount	price
Candy A	2.50	x	2.50x
Candy B	3.50	y	3.50y

$$2.50x + 3.50y = 30$$

$$x + y = 10$$

$$\begin{aligned} x &= 5 \text{ pounds} \\ y &= 5 \text{ pounds} \end{aligned}$$

7

	Amount	time	rate
Pump A	1 pool	5 hr	$\frac{1}{5} \frac{\text{pool}}{\text{hr}}$
Pump B	1 pool	6 hr	$\frac{1}{6} \frac{\text{pool}}{\text{hr}}$

combined rate:  $\left(\frac{1}{5} + \frac{1}{6}\right) \frac{\text{pool}}{\text{hr}}$

$$\left(\frac{1}{5} + \frac{1}{6}\right) 2 + \frac{1}{6} t = 1 \text{ pool}$$

first 2 hr

$$t = \frac{8}{5} = 1.6 \text{ hr}$$

- 8 let  $d$  be the number of days  
let  $m$  be the number of miles

$$5(30) + 0.25(400) = \$250$$

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	% Acid	Volume	amount of acid
Solution A	30	$x$	$0.3x$
Solution B	50	$y$	$0.5y$

$$x + y = 10$$

$$0.3x + 0.5y = 0.45(10)$$

$$x = 2.5 \text{ L}$$

$$y = 7.5 \text{ L}$$

10 50 mph for 2 hr = 100 miles

11  $500 + 50t = 1500$ ,  $t = 20 \text{ hr}$