Homework review: p. 457-8

(6a) final 500 mL of 20% acid 80% water

1st	x mL	of	10% acid	90% water
2nd	y mL	of	30% acid	70% water

$$x + y = 500$$

$$\underbrace{.10x}_{\text{acid in 1st sol.}} + \underbrace{.30y}_{\text{acid in 2nd sol.}} = \underbrace{.20(500)}_{\text{acid in final sol.}}$$

$$.1x + .3y = 100$$

1a 15 min → 15 km (N)

12 min → 15 km (S)

x ↑ y ↓

N: $s = \frac{d}{t} = \frac{15\text{ km}}{15\text{ min}} = 1\frac{\text{km}}{\text{min}} = 60\frac{\text{km}}{\text{hr}}$

S: $s = \frac{d}{t} = \frac{15\text{ km}}{12\text{ min}} = 1.25\frac{\text{km}}{\text{min}} = 75\frac{\text{km}}{\text{hr}}$

1b

$x + y = 75$

$x - y = 60$

1c

$2x = 135$

$x = 67.5$

$67.5 - y = 60$

$-y = -7.5$

$y = 7.5$

67.5 km/hr

7.5 km/hr

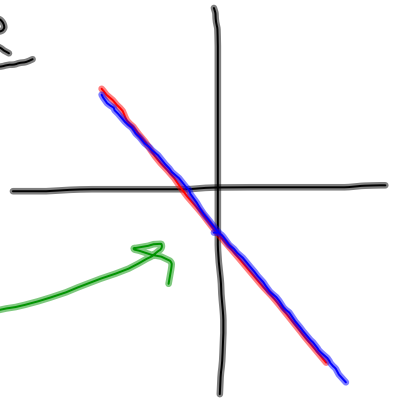
Av. speed in still air: x

Wind speed: y

Special Types of Linear Systems

- A "normal" linear system has <u>one</u> solution and can be graphed as a pair of intersecting lines

- Some linear systems have no solution- if the lines are parallel and have different y-intercepts
- Linear systems where the two lines are parallel and have the <u>same</u> y-intercept have an infinite # of solutions



Identify the type of linear system by:

put the equations into $y = mx + b$ format

- if two m's are different — this is a normal linear system
- if the m's are the same but the b's are different, there's no solution
- if the m's and b's are the same, there are an infinite number of solutions

4. $-6x + 2y = -2$

$-3x + y = 2$

no solution

$-6x + 2y = -2$

$+6x \quad +6x$

$\frac{2y}{2} = \frac{6x - 2}{2}$

$y = 3x - 1$

$-3x + y = 2$

$+3x \quad +3x$

$y = 3x + 2$

5. $2y - x = -4$

$2x + y = 3$

one sol.

$2y - x = -4$

$2y = x - 4$

$y = \frac{1}{2}x - 2$

$2x + y = 3$

$y = -2x + 3$

6. $4x - y = 2$

$-x + 3y = 9$

one sol.

$-y = -4x + 2$

$y = 4x - 2$

$3y = x + 9$

$y = \frac{1}{3}x + 3$

7. $x + 2y = 3$

$-x + 2y = -2$

one sol

$2y = -x + 3$

$y = -\frac{1}{2}x + \frac{3}{2}$

$2y = x - 2$

$y = \frac{1}{2}x - 1$

8. $3x + y = 4$

$x + \frac{1}{3}y = 2$

no sol

$y = -3x + 4$

$\frac{1}{3}y = -x + 2$

$y = -3x + 6$

9. $2x - y = 4$

$-2x + y = -4$

inf. # of sol.

$-y = -2x + 4$

$y = 2x - 4$

$y = 2x - 4$

26. Comedy Tickets The table below shows the ticket sales at an all-ages comedy club on a Friday night and a Saturday night.

Day	Number of adult tickets (x)	Number of student tickets (y)	Total sales (dollars)
Friday	30	20	910
Saturday	45	30	1365

a. Let x represent the cost (in dollars) of one adult ticket and let y represent the cost (in dollars) of one student ticket. Write a linear system that models the situation.

$30x + 20y = 910$
$45x + 30y = 1365$

$3x + 2y = 91$
$3x + 2y = 91$

$2y = -3x + 91$

$y = \frac{-3}{2}x + \frac{91}{2}$

b. Solve the linear system.

$3x + 2\left(\frac{-3}{2}x + \frac{91}{2}\right) = 91$

$3x + -3x + 91 = 91$

$0 = 0$ ✓

inf. # of sol.

20. Lift Tickets Two families go skiing on a Saturday. One family purchases two adult lift tickets and four youth lift tickets for \$166. Another family purchases four adult lift tickets and five youth lift tickets for \$263. Let x represent the cost in dollars of one adult lift ticket and let y represent the cost in dollars of one youth lift ticket.

a. Write a linear system that represents this situation.

b. Solve the linear system to find the cost of one adult and one youth lift ticket.

c. How much would it cost two adults and five youths to ski for a day?

$2x + 4y = 166 \rightarrow x + 2y = 83$

$4x + 5y = 263$

$x = -2y + 83$

$4(-2y + 83) + 5y = 263$

$2 \cdot x + 5 \cdot y =$

$-8y + 332 + 5y = 263$

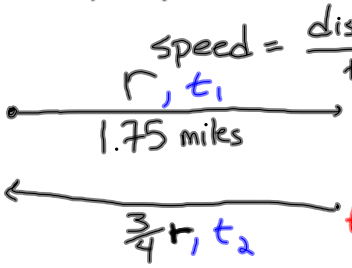
$-3y = -69$

$y = 23$ - youth

$x = -2(23) + 83$

$= -46 + 83 = 37$ - adult

22. Getting to School You walk 1.75 miles to school at an average speed r (in miles per hour). On the way back home, you are walking with a friend and your average speed is $\frac{3}{4}r$. The round trip took a total of 90 minutes. Find the average speed for each leg of your trip.



speed = distance / time $r = \frac{d}{t}$

$t_1 \cdot r = \frac{d}{t_1} = \frac{1.75\text{ mi}}{t_1} \cdot t_1 \cdot \frac{1}{r}$

$t_2 \cdot \frac{3}{4}r = \frac{d}{t_2} = \frac{1.75\text{ mi}}{t_2} \cdot t_2 \cdot \frac{1}{\frac{3}{4}r}$

$t_1 + t_2 = 90$

$t_1 = \frac{1.75\text{ mi}}{r}$

$t_2 \cdot \frac{3}{4}r = \frac{1.75\text{ mi}}{t_2} \cdot t_2$

$\frac{\frac{3}{4}r \cdot t_2}{\frac{3}{4}r} = \frac{1.75\text{ mi}}{\frac{3}{4} \cdot r}$

$t_1 + t_2 = 90$

$t_2 = \frac{1.75\text{ mi}}{\frac{3}{4} \cdot r}$

$r\left(\frac{1.75}{r} + \frac{1.75}{\frac{3}{4}r}\right) = 90 \cdot r$

$1.75 + \frac{1.75}{.75} = 90 \cdot r$

$1.75 + 2.333 = 90r$

$\frac{4.083}{90} = \frac{90r}{90}$

$r = 0.0454 \frac{\text{mi}}{\text{min}}$

2.72 mph

$\frac{3}{4}r = 0.034 \frac{\text{mi}}{\text{min}}$

2.04 mph

17. Painting and Cleaning During the spring and summer, you do a spring yard cleanup for households and you also paint houses. You earn $8 an hour doing the cleanups and $12 an hour painting. Last spring and summer, you worked a total of 400 hours and earned $3800. How many hours did you spend doing yard cleanups? How many hours did you spend painting?

Clean - $8/hr

Paint - $12/hr

400 hrs - $3800

2 eq's - x & y

x - # hours painting

y - # hours cleaning

$x + y = 400$ $\quad y = -x + 400$

$12x + 8y = 3800$

↑ how much I made painting ↑ how much I made cleaning

$3x + 2y = 950$

$3x + 2(-x + 400) = 950$

$3x - 2x + 800 = 950$

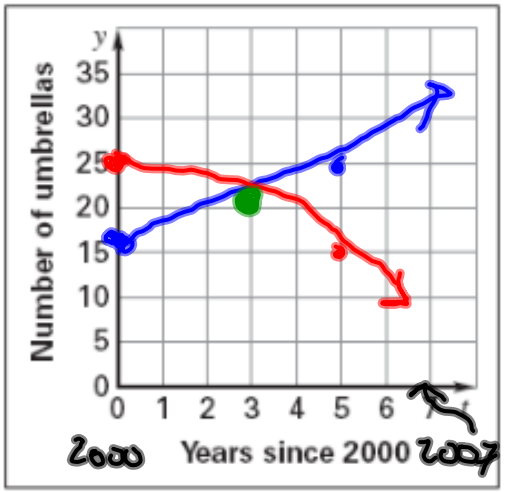
$x = 150$ = # hrs painting

$y = 250$ = # hrs cleaning

19. Umbrella Sales The table shows the number of automatic and manual opening umbrellas sold at a shop in 2000 and 2005. Use a linear model to represent the sales of each type of umbrella. Let $t = 0$ correspond to 2000. Sketch the graphs and estimate when the number of automatic umbrellas sold equaled the number of manual umbrellas sold.

Year	2000	2005
Automatic	15	25
Manual	25	15

2003



(Don't need two eq's)

?! Ronny eats bugs

Homework – p. 462, 3 – 36 (every 3rd), 37