

# Math 107

## Spring 2017

### Lecture 10

John & Jane took off, going opposite directions.  
After 2 hrs, they were 250 miles apart.

Jane's speed was 10 mph slower than twice  
the speed by John.

find speed for both.

Total distance = 250 miles

Cat.	r	• t	= d
John	$x$	$\cdot 2$	$= 2x$
Jane	$2x - 10$	$\cdot 2$	$= 2(2x - 10)$

Distance by John + Distance by Jane = 250 miles

$$2x + 2(2x - 10) = 250$$

$$2x + 4x - 20 = 250$$

$$6x = 270$$

$$x = \frac{270}{6}$$

$$x = 45$$

John = 45 mph

Jane = 80 mph

Mike drove 1.5 hrs with traffic and 3 hrs without. Total distance was 270 miles. His speed in no traffic area was 15mph more than twice his speed in traffic area. Find his speed in both part of this trip.

$$1.5x + 3(2x+15) = 270$$

$$1.5x + 6x + 45 = 270$$

$$7.5x = 225$$

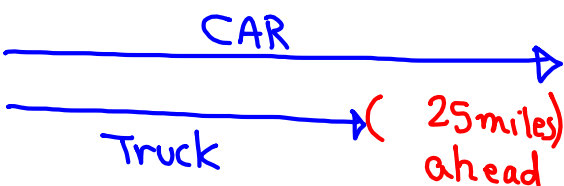
$$x = \frac{225}{7.5} \quad x = 30$$

Cat.	r	t	= d
with Traf.	x	1.5	= 1.5x
without Traf.	2x+15	3	= 3(2x+15)

30 mph in traffic  
75 mph in no traf.

A car and a truck left at the same time going same direction. Speed for car 50mph  
Speed for truck 40mph.

How long does it take before they are

25 miles apart. 

$$\begin{array}{rcl} \text{Distance by Car} & - & \text{Distance by Truck} = 25 \\ 50 \cdot t & - & 40 \cdot t = 25 \end{array}$$

$$10t = 25$$

$$t = \frac{25}{10}$$

$$t = 2.5$$

2.5 hrs

# Money Problem (Coins & Bills)

Moe has \$1.65 in nickels & Dimes.

The number of dimes is 1 fewer than twice the number of nickels.

How many of each?

Type	Number	Worth	Amount
Nickels	$x$	5¢	$5x$
Dimes	$2x-1$	10¢	$10(2x-1)$

Total Amount = \$1.65

$$5x + 10(2x-1) = 165$$

$$5x + 20x - 10 = 165$$

$$25x = 175$$

$$x = 7$$

7 Nickels

13 Dimes

Maria has \$3.20 in Dimes & Quarters only. She has 20 total coins. How many of

Types	Number	Worth	Amount
Dimes	$x$	10¢	$10x$
Quarters	$20-x$	25¢	$25(20-x)$

Total amount = \$3.20

$$10x + 25(20-x) = 320$$

$$10x + 500 - 25x = 320$$

$$-15x = 320 - 500$$

$$-15x = -180$$

$$x = \frac{-180}{-15}$$

$$x = 12$$

12 Dimes &

8 Quarters

Lisa paid \$2.84 and purchased two different color balloons. Red color @ 7¢ each,  
Blue = @ 8¢ each.

the number of red color balloons was 13  
fewer than the # of blue color balloons.

How many of each?

Type	Number	worth	Amount
Red	$x-13$	7¢	$7(x-13)$
Blue	$x$	8¢	$8x$

$$7(x-13) + 8x = 284$$

$$7x - 91 + 8x = 284$$

$$15x = 284 + 91$$

$$15x = 375$$

$$x = \frac{375}{15}$$

$$x = 25$$

25 Blue &  
12 Red

When Maria closed her shift, she had \$910  
in Fives, Tens, and Twenties.

The number of tens was 1 more than twice  
the number of fives.

The number of twenties was 5 fewer than  
5 times the number of fives.

How many of each?

$$10(2x+1) + 5x + 20(5x-5) = 910$$

$$20x + 10 + 5x + 100x - 100 = 910$$

$$125x = 1000$$

Type	Number	Worth	Amount
Tens	$2x+1$	\$10	$10(2x+1)$
Fives	$x$	\$5	$5x$
Twenties	$5x-5$	\$20	$20(5x-5)$

$$x = \frac{1000}{125}$$

$$x = 8$$

8 Fives, 17 Tens, and 35 Twenties

Work on Distance &  
Money chapters.

7 & 8