3.1

Simple Interest

Interest = principal · rate · time

$I = prt$

(ex) You have \$1,000 in an account earning 7.5% for 1 year. How much interest?

$I = 1{,}000(.075)(1)$

$= \boxed{75}$

(ex) You invest \$10,000 in 2 accounts one earning 7% and the other 9% for 3 years. You earn \$2580 in interest. How much was in each account?

Let x = amt in 1st account

$10{,}000 - x$ = amt in 2nd account

I	=	p	×	r	× t
$x(.07)(3)$		x		.07	3
$(10{,}000-x)(.09)(3)$		$(10{,}000-x)$		.09	3

total interest = \$2580

$2580 = x(.07)(3) + (10{,}000-x)(.09)(3)$

$2580 = .21x + .27(10{,}000-x)$

$2580 = .21x + 2700 - .27x$

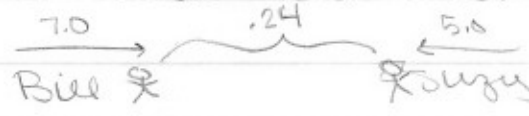
$2580 = -.06x + 2700$

$-120 = -.06x \longrightarrow x = 2000$ so \$2,000 & \$8,000

Solving Motion Problems

$d = rt$ (distance = rate × time)

Ex Suzy and Bill are running towards each other. Suzy runs at 5.0 mph, Bill runs at 7.0 mph, they start out .24 miles apart. When will Bill and Suzy meet?



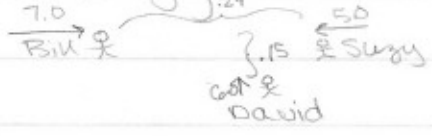
Bill's Distance + Suzy's Distance = .24

$7.0t + 5.0t = .24$

$12t = .24$

$t = .24/12 = .02$ hours (or 1.2 m.)

David is .15 miles from Bill & Suzy's meeting point, running at 6.0 mph. Will David get to Suzy first?



$.15 = 6.0t$

$.025 = t$ so $t = .025$ hrs (or 1.5 m.)

missed her by 18 seconds.

Solving Mixture Problems

(ex) You want 16 oz. of a 25% pop mixture. You have 2 glasses of the mixture. Glass A is 30% pop, Glass B is 10% pop, how can you mix these to get 25% pop.

$$.30x + .10(16-x) = .25(16)$$
$$.30x + 1.6 - .10x = 4$$
$$.20x + 1.6 = 4$$
$$.20x = 2.4$$
$$x = 12$$

12 oz of 30%, 4 oz of 10%

(ex) 5 lb. of nuts costing $2 per lb. and I have other nuts costing $7 per lb. I mix the two together to get a mixture worth $6 a lb. How many lbs. of mixed nuts do I have?

Say x = lbs. of mixed nuts
5 lbs of "cheap nuts"
$x-5$ lbs of "expensive nuts"

I have $5(\$2) = \$10$ worth of "cheap nuts"
I have $(x-5)(\$7) = 7x-35$ worth of "expensive nuts"
I have $x(\$6) = 6x$ worth of mixed nuts

$$10 + 7x - 35 = 6x$$
$$7x - 25 = 6x$$
$$\boxed{x = 25 \text{ lbs.}}$$