4.5

1) A collection of dimes and quarters is worth S15.25. There are 103 coins in all. How many of each is there?

N	V	T
D	10	10D
Q	25	25Q
103		1525

$(-10)(D + Q) = (103)(-10)$

$10D + 25Q = 1525$

$\underline{-10D - 10Q = -1030}$

$\dfrac{15Q}{15} = \dfrac{495}{15}$

$Q = 33$

$D + 33 = 103$

$\underline{-33 \quad -33}$

$D = 70$

70 $dimes$

33 $Quarters$

3) The attendance at a school concert was 578. Admission was $2.00 for adults and $1.50 for children. The total receipts were S985.00. How many adults and how many children attended?

N	V	T
A	2	2A
C	1.5	1.5C
578		985

$-2(A + C) = (578)(-2)$

$2A + 1.5C = 985$

$\underline{-2A - 2C = -1156}$

$\dfrac{-0.5C}{-0.5} = \dfrac{-1156}{-0.5}$

$C = 342$

$A + 342 = 578$

$\underline{-342 \quad -342}$

$A = 236$

236 $Adults$

342 $Children$

5) A boy has $2.25 in nickels and dimes. If there are twice as many dimes as nickels, how many of each kind has he?

N	V	T
N	5	5N
D=2N	10	20N
		225

$5N + 20N = 225$

$\dfrac{25N}{25} = \dfrac{225}{25}$

$N = 9$

$D = 2(9) = 18$

9 $Nickels$

18 $Dimes$

7) A collection of 27 coins consisting of nickels and dimes amounts to $2.25. How many coins of each kind are there?

N	V	T
N	S	SN
D	10	10D
27		225

$(-10)(N + D) = (27)(-10)$

$5N + 10D = 225$

$\underline{-10N - 10D = -270}$

$\dfrac{-5N}{-5} = \dfrac{-45}{-5}$

$N = 9$

$9 + D = 27$

$\underline{-9 \quad -9}$

$D = 18$

18 $Dimes$

9 $Nickels$

9) There were 429 people at a play. Admission was $1 each for adults and 75 cents each for children. The receipts were $372.50. How many children and how many adults attended?

N	V	T
A	1	A
C	.75	.75C
429		372.50

$(-1)(A + C) = (429)(-1)$

$A + .75C = 372.5$

$\underline{-A - C \quad = -429}$

$\dfrac{-.25C}{-.25} = \dfrac{-56.5}{-.25}$

$C = 226$

$A + 226 = 429$

$\underline{-226 \ -226}$

$\quad A = 203$

$203 \ Adults$

$226 \ Children$

11) There were 203 tickets sold for a volleyball game. For activity-card holders, the price was $1.25 each and for non-card holders the price was $2 each. The total amount of money collected was $310. How many of each type of ticket was sold?

N	V	T
A	1.25	1.25A
N	2	2N
203		310

$-2(A + N) = (203)(-2)$

$1.25A + 2N = 310$

$\underline{-2A - 2N = -406}$

$\dfrac{-.75A}{-.75} = \dfrac{-96}{-.75}$

$A = 128$

$128 + N = 203$

$\underline{-128 \quad \ - 128}$

$\quad N = 75$

$75 \ Non \ Card$

$128 \ Activity \ Card$

13) At a recent Vikings game $445 in admission tickets was taken in. The cost of a student ticket was $1.50 and the cost of a non-student ticket was $2.50. A total of 232 tickets were sold. How many students and how many nonstudents attended the game?

N	V	T
5	1.5	1.55
N	2.5	2.5N
232		445

$-1.5(5 + N) = (232)(-1.5)$

$1.55 + 2.5N = 445$

$\underline{-1.55 - 1.5N = 348}$

$\quad N = 97$

$S + 97 = 232$

$\underline{-97 \quad - 97}$

$\quad S = 135$

$97 \ Non - Students$

$135 \ Students$

15) A coin purse contains 18 coins in nickels and dimes. The coins have a total value of $1.15. Find the number of nickels and dimes in the coin purse.

N	V	T
N	5	5N
D	10	100
18		115

$-5(N + D) = (18)(-5)$
$5N + 10D = 115$
$-5N - 5D = -90$
$$\frac{5D}{5} = \frac{25}{5}$$

$N + 5 = 18$
$\underline{-5 \quad -5}$
$N = 13$

$D = 5$

13 $Nickels$
5 $Dimes$

17)) A postal clerk sold some 15¢ stamps and some 25¢ stamps. Altogether, 15 stamps were sold for a total cost of $3.15. How many of each type of stamps were sold?

N	V	T
F	15	15F
T	25	25T
15		315

$-15(F + T) = (15)(-15)$
$15F + 25T = 315$
$-15F - 15T = -225$
$$\frac{10T}{10} = \frac{90}{10}$$
$T = 9$

$F + 9 = 15$
$\underline{-9 \quad -9}$
$F = 6$

6 $Fifteen\ cents, 9\ twenty - five\ cents$

19) The total value of dimes and quarters in a bank is $6.05. There are six more quarters than dimes. Find the number of each type of coin in the bank.

N	V	T
D	10	10D
Q=D+6	25	25D+150
		605

$10D + 25D + 150D = 605$
$35D + 150 = 605$
$\underline{-150 \quad -150}$
$$\frac{35D}{35} = \frac{455}{35}$$
$D = 13$

$Q = 13 + 6$
$Q = 19$

13 $Dimes$
19 $Quarters$

21) A coin bank contains nickels and dimes. The number of dimes is 10 less than twice the number of nickels. The total value of all the coins is $2.75. Find the number of each type of coin in the bank.

N	V	T
N	5	5N
D=2N−10	10	20N−100
		275

$5N + 20N - 100 = 275$
$25N - 100 = 275$
$\underline{+100 \quad +100}$
$$\frac{25N}{25} = \frac{375}{25}$$
$N = 15$

$D = 2(15) - 10$
$D = 30 - 20$
$D = 10$

20 $Dimes$
15 $Nickels$

23) A bank teller cashed a check for $200 using twenty dollar bills and ten dollar bills. In all, twelve bills were handed to the customer. Find the number of twenty dollar bills and the number of ten dollar bills.

N	V	T
W	20	20W
T	10	10T
12		200

$-10(W + T) = (12)(-10)$
$20W + 10T = 200$
$-10W - 10T = -120$
$$\frac{10W}{10} = \frac{80}{10}$$

$8 + T = 12$
$\underline{-8 \qquad -8}$
$T = 4$

$$W = 8 \qquad 4\,Tens$$
$$8\,Twenties$$

25) A total of $27000 is invested, part of it at 12% and the rest at 13%. The total interest after one year is $3385. How much was invested at each rate?

N	V	T
x	.12	.12x
y	.13	.13y
27000		3385

$$-.12(x + y) = (27000)(-.12)$$
$$.12x + .13y = 3385$$
$$\underline{-.12x - .12y = -3240}$$
$$\frac{-.01y}{-.01} = \frac{-145}{-.01}$$
$$y = 14500$$

$$x + 14500 = 27000$$
$$\underline{-14500 \quad -14500}$$
$$x = 12500$$

$12,500 @12%
$14,500 @ 13%

27) A total of $9000 is invested, part of it at 10% and the rest at 12%. The total interest after one year is $1030. How much was invested at each rate?

N	V	T
x	.10	.1x
y	.12	.12y
9000		1030

$$-.1(x + y) = (9000)(-.1)$$
$$.1 + .12y = 1030$$
$$\underline{-.1x - .1y = -900}$$
$$\frac{.02y}{.02} = \frac{130}{.02}$$
$$y = 6500$$

$$x + 6500 = 9000$$
$$\underline{-6500 \quad -6500}$$
$$x = 2500$$

$2500 @ 10%
$6500 @ 12%

29) An inheritance of $10000 is invested in 2 ways, part at 9.5% and the remainder at 11%. The combined annual interest was $1038.50. How much was invested at each rate?

N	V	T
x	.095	.095x
y	.11	.11y
10000		1038.50

$$-.095(x + y) = (10000)(-.095)$$
$$.095x + .11y = 1038.50$$
$$\underline{-.095x - .095y = -950}$$
$$\frac{0.015y}{.015} = \frac{88.5}{.015}$$
$$y = 5900$$

$$x + 5900 = 10000$$
$$\underline{-5900 \quad -5900}$$
$$x = 4100$$

$4100 @ 9.5%
$5900 @11%

31) Jason earned $256 interest last year on his investments. If $1600 was invested at a certain rate of return and $2400 was invested in a fund with a rate that was double the rate of the first fund, find the two rates of interest.

N	V	T
1600	x	1600x
2400	2x	4800x
		256

$$1600x + 4800x = 256$$
$$\frac{6400x}{6400} = \frac{256}{6400}$$
$$x = 0.04$$
$$2x = 0.08$$

$1600 @ 4%
$2400 @ 8%

33) A total of \$8500 is invested, part of it at 6% and the rest at 3.5%. The total interest after one year is \$385. How much was invested at each rate?

N	V	T
x	.06	.06x
y	.035	.035y
8500		385

$-.035(x + y) = (8500)(-.035)$

$.06x + .035y = 385$

$\underline{-.035x - .035y = -297.5}$

$\dfrac{.025x}{.025} = \dfrac{87.5}{.025}$

$x = 3500$

$3500 + y = 8500$

$\underline{-3500 \qquad -3500}$

$y = 5000$

\$3500 @ 6%

\$5000 @ 3.5%

35) A total of \$15000 is invested, part of it at 8% and the rest at 11%. The total interest after one year is \$1455. How much was invested at each rate?

N	V	T
x	.08	.08x
y	.11	.11y
15000		1455

$-.08(x + y) = (15000)(-.08)$

$.08x + .11y = 1455$

$\underline{-.08x - .08y = -1200}$

$\dfrac{.03y}{.03} = \dfrac{255}{.03}$

$y = 8500$

$x + 8500 = 15000$

$\underline{-8500 \qquad -8500}$

$x = 6500$

\$6500 @ 8%

\$8500 @ 11%

37) A total of \$6000 is invested, part of it at 4.25% and the rest at 5.75%. The total interest after one year is \$300. How much was invested at each rate?

N	V	T
x	.0425	.0425x
y	.0575	.0575y
6000		300

$-.0425(x + y) = (6000)(-.0425)$

$.0425x + .0575y = 300$

$\underline{-.0425x - .0425y = -255}$

$\dfrac{.015y}{.015} = \dfrac{45}{.014}$

$y = 3000$

$x + 3000 = 6000$

$\underline{-3000 \quad -3000}$

$x = 3000$

\$3000 @ 4.25%

\$3000 @ 5.75%

39) A total of \$11000 is invested, part of it at 6.8% and the rest at 8.2%. The total interest after one year is \$797. How much was invested at each rate?

N	V	T
x	.068	.068x
y	.082	.082y
11000		797

$-.068(x + y) = (11000)(-.068)$

$.068x + .082y = 797$

$\underline{-.068x - .068y = -748}$

$\dfrac{.014y}{.014} = \dfrac{49}{.014}$

$y = 3500$

$x + 3500 = 11000$

$\underline{-3500 \quad -3500}$

$x = 7500$

\$7500 @ 6.8%

\$3500 @8.2%

41) Samantha earned $1480 in interest last year on her investments. If $5000 was invested at a certain rate of return and $11000 was invested in a fund with a rate that was two-thirds the rate of the first fund, find the two rates of interest.

N	V	T
5000	x	5000x
11000	$\frac{2}{3}x$	$\frac{22000}{3}x$
		1480

$$3\left(5000x + \frac{22000}{3}x\right) = (1480)3$$

$$\underline{15000x + 22000x = 4440}$$

$$\frac{37000x}{37000} = \frac{4440}{37000}$$

$$x = .12$$

$$\frac{2}{3}(.12) = .08$$

$5000 @ 12\%$

$11000 @ 8\%$

43) 30 coins having a value of $3.30 consists of nickels, dimes and quarters. If there are twice as many quarters as dimes, how many coins of each kind were there?

N	V	T
N	5	5N
D	10	10D
Q=2D	25	25D
30		330

$N + D + 2D = 30$

$5N + 10D + 50D = 330$

$(-5)(N + 3D) = (30)(-5)$

$5N + 60D = 330$

$-5N - 15D = -150$

$\frac{45D}{45} = \frac{180}{45}$

$D = 4$

$N + 3(4) = 30$

$N + 12 = 30$

$\underline{ -12 \quad -12}$

$N = 18$

$Q = 2(4) = 8$

$18\ Nickels$

$4\ Dimes$

$8\ Quarters$