Answer all questions in your notebooks, using FULL SOLUTIONS.

Number Problems

1. b) Determine three consecutive even numbers with a sum of 252.

Let $n, n+2, n+4$ be the numbers

$n + n+2 + n+4 = 252$

$3n + 6 - 6 = 252 - 6$

$\frac{3n}{3} = \frac{246}{3}$

$n = 82$

$\therefore$ 82, 84, 86

d) Two numbers have a difference of 123. The larger number is 22 more than twice the smaller. Determine the numbers.

Let "s" be the smaller number

smaller	larger
s	2s + 22

$2s + 22 - s = 123$

$s + 22 - 22 = 123 - 22$

$\boxed{s = 101}$

$\therefore$ The smaller number is 101

larger number is $2(101) + 22 = 202 + 22 = 224$

e) The sum of two numbers is 249. Twice the first number plus 3 times the second number is 591. Determine the numbers.

Let "f" be the first number

1st	2nd
f	249 - f

$2f + 3(249 - f) = 591$

$2f + 747 - 3f = 591$

$-f + 747 - 747 = 591 - 747$

$\frac{-f}{-1} = \frac{-156}{-1}$

$\boxed{f = 156}$

The 1st number is 156

2nd number is $249 - 156 = 93$

Money Problems:

2. c) Ron has $21.90 made up of dimes and quarters. If there are 117 coins in all, how many quarters are there?

Let "q" be the number of quarters

quarters	dimes
q	117 - q

$25q + 10(117 - q) = 2190$

$25q + 1170 - 10q = 2190$

$15q + 1170 - 1170 = 2190 - 1170$

$\frac{15q}{15} = \frac{1020}{15}$

$\boxed{q = 68}$

$\therefore$ There're 68 quarters

e) Helga has $300 made up of $5 and $10 bills. If there are 3 more $10 bills than $5 bills, how many $5 bills does she have?

Let "f" be the number $5 bills

$5 bills	$10 bills
f	$f+3$

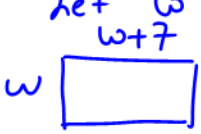
$5f + 10(f+3) = 300$
$5f + 10f + 30 = 300$
$15f + 30 - 30 = 300 - 30$
$\frac{15f}{15} = \frac{270}{15}$
$f = 18$

∴ Helga has 18 $5 bills.

Other Problems:

3. a) The length of a rectangle is 7m longer than the width. If the perimeter of the rectangle is 194m, what are the dimensions of the rectangle?

Let "w" be the width



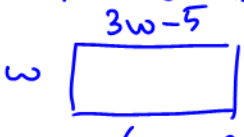
$2(w + w + 7) = 194$
$2(2w + 7) = 194$
$4w + 14 - 14 = 194 - 14$
$\frac{4w}{4} = \frac{180}{4}$
$w = 45$

∴ The width is 45m and length is 52m.

Challenge Problems

4. a) A large billboard has a length measuring 5 metres less than triple its width. The perimeter of the billboard is 110 m. What is the width of the billboard?

Let "w" be the width



$2(w + 3w - 5) = 110$
$2(4w - 5) = 110$
$8w - 10 + 10 = 110 + 10$
$\frac{8w}{8} = \frac{120}{8}$
$w = 15$

∴ The width is 15m.

c) On a test, some problems were worth 5 marks and others were worth 4 marks. Andrew correctly solved 18 problems and got a mark of 83. How many 5-mark problems did he correctly solve?

let "f" be the number of 5-mark problems

5mark	4mark
f	18−f

$5f + 4(18-f) = 83$

$5f + 72 - 4f = 83$

$f + 72 - 72 = 83 - 72$

$\boxed{f = 11}$

∴ There are 11 5-mark problems

e) George's teacher refused to reveal her age. After being begged for a hint she finally admitted that in 12 years she would be three times as old as she was 20 years ago. How old is she?

let "a" be the teacher's age.

past	future
a−20	a+12

$a + 12 = 3(a-20)$

$a + 12 = 3a - 60$ (+60)

$a + 72 = 3a$ (−a)

$\frac{72}{2} = \frac{2a}{2}$

$\boxed{a = 36}$

∴ She's 36 years old

f) A piggy bank contains twice as many quarters as dimes, and half as many nickels as dimes. There are 91 coins in total. How much is in the piggy bank?

let "d" the number of dimes

nickels	dimes	quarter
$\frac{d}{2}$	d	2d

$\frac{d}{2} + d + 2d = 91$

$\frac{d}{2} + \frac{2 \cdot 3d}{2 \cdot 1} = 91$

$\frac{d + 6d}{2} = 91$

$\frac{7d}{2} = \frac{91}{1}$

$\frac{7d}{7} = \frac{182}{7}$

$\boxed{d = 26}$

We have
13 nickels
26 dimes
52 quarters

Total $= 5(13) + 26(10) + 52(25)$
$= 65 + 260 + 1300$
$= 1625$

∴ $16.25 in the bank.