

Consecutive Integer Problems

4. a) Complete the charts using **consecutive** integers.

Consecutive:
Following one after another in order – in an uninterrupted sequence.

| Consecutive Integers: | | | |
|-----------------------|----------------|---------------|---------------------------------------|
| First Integer | Second Integer | Third Integer | Sum of all Three Consecutive Integers |
| 1 | 2 | 3 | $1 + 2 + 3 = 6$ |
| 10 | 11 | 12 | $10 + 11 + 12 = 33$ |
| 29 | 30 | 31 | $29 + 30 + 31 = 90$ |
| n | n+1 | n+2 | $n + n + 1 + n + 2 = 3n + 3$ |

| First Even Integer | Second Even Integer | Third Even Integer | Sum of all Three Even Integers |
|--------------------|---------------------|--------------------|--------------------------------|
| 2 | 4 | 6 | $2 + 4 + 6$ |
| 16 | 18 | 20 | $16 + 18 + 20$ |
| n | n+2 | n+4 | |

| First Odd Integer | Second Odd Integer | Third Odd Integer | Sum of all Three Odd Integers |
|-------------------|--------------------|-------------------|-------------------------------|
| 1 | 3 | 5 | $1 + 3 + 5$ |
| 29 | 31 | 33 | $29 + 31 + 33$ |
| n | n+2 | n+4 | $n + n + 2 + n + 4$ |

Using the ideas from the charts above, solve the following problems **in your notebooks**.

- b) Determine three consecutive integers whose sum is 246.
(* * 'Let n, n+1, n+2 represent the numbers' should be the opening statement)
- c) Determine three consecutive integers whose sum is 1026.
- d) Determine four consecutive integers whose sum is 490.
- e) Determine four consecutive integers whose sum is 106.
- f) Determine five consecutive integers whose sum is -115.
- g) Determine three consecutive odd integers whose sum is 39.
- h) Determine three consecutive even integers whose sum is 222.
- i) There are three consecutive integers so that when the double of the first is added to triple the second and then added to double the third, the result is 406. Determine the original integers.
- j) There are four consecutive even integers. When double the third is subtracted from the sum of the first two, the result is . . . ?

Answers:

- 4. b) 81, 82, 83 c) 341, 342, 343 d) 121, 122, 123, 124
- e) 25, 26, 27, 28 f) -25, -24, -23, -22, -21 g) 11, 13, 15
- h) 72, 74, 76 i) 57, 58, 59

b. Let $n, n+1, n+2$ represent the numbers

$$n + (n+1) + (n+2) = 246$$

$$n + n + 1 + n + 2 = 246$$

$$3n + 3 - 3 = 246 - 3$$

$$\frac{3n}{3} = \frac{243}{3}$$

$$\boxed{n = 81}$$

\therefore The numbers are 81, 82, 83

c. Let $n, n+1, n+2$ be the numbers.

$$n + n + 1 + n + 2 = 1026$$

$$3n + 3 - 3 = 1026 - 3$$

$$\frac{3n}{3} = \frac{1023}{3}$$

$$n = 341$$

\therefore The numbers are 341, 342, 343

d. Let $n, n+1, n+2, n+3$ represent the numbers

$$n + n + 1 + n + 2 + n + 3 = 490$$

$$4n + 6 - 6 = 490 - 6$$

$$\frac{4n}{4} = \frac{484}{4}$$

$$\boxed{n = 121}$$

\therefore The numbers are 121, 122, 123, 124

f. Let $n, n+1, n+2, n+3, n+4$ rep. the numbers

$$n + n + 1 + n + 2 + n + 3 + n + 4 = -115$$

$$5n + 10 - 10 = -115 - 10$$

$$\frac{5n}{5} = \frac{-125}{5}$$

$$\boxed{n = -25}$$

\therefore The numbers are -25, -24, -23, -22, -21

g. Let $n, n+2, n+4$ be the #

$$n+n+2+n+4 = 39$$

$$3n + 6 - 6 = 39 - 6$$

$$\frac{3n}{3} = \frac{33}{3}$$

$$\boxed{n = 11}$$

\therefore The numbers are 11, 13, 15

h. Let $n, n+2, n+4$ rep. the #s

$$n+n+2+n+4 = 222$$

$$3n + 6 - 6 = 222 - 6$$

$$\frac{3n}{3} = \frac{216}{3}$$

$$\boxed{n = 72}$$

\therefore The numbers are 72, 74, 76

i. Let $n, n+1, n+2$ rep. #s.

$$2n + 3(n+1) + 2(n+2) = 406$$

$$\underline{2n} + \underline{3n} + 3 + \underline{2n} + 4 = 406$$

$$7n + 7 - 7 = 406 - 7$$

$$\frac{7n}{7} = \frac{399}{7}$$

$$\boxed{n = 57}$$

\therefore The numbers are 57, 58, 59

U. Let $n, n+2, n+4, n+6$ rep. the numbers

Method 1 and sub 2 for n

2, 4, 6, 8 are possible four consecutive even integers.

$$(2+4) - 2(6) = 6 - 12 = -6$$

Method 2 Or

$$\begin{aligned} &= (n+n+2) - 2(n+4) \\ &= 2n+2 - 2n-8 \\ &= -6 \end{aligned}$$

1. a) The ages of Sean and Ricky add up to 21.
i) Use the table at right to show possible ages.
ii) Determine the difference in their ages.
b) Use the table to help solve the following problem:

| Sean's Age | Ricky's Age | Difference in Ages |
|------------|-------------|--------------------------|
| 20 | 1 | $20 - 1 = 19$ |
| 19 | 2 | $19 - 2 = 17$ |
| 15 | 6 | $15 - 6 = 9$ |
| a | $21 - a$ | $a - (21 - a) = 2a - 21$ |

The ages of Sean and his younger brother Ricky add up to 21. If the difference of their ages is 13, determine their ages. Let "a" rep Sean's age

| Sean | Ricky |
|------|----------|
| a | $21 - a$ |

$$a - (21 - a) = 13$$

$$a - 21 + a = 13$$

$$2a - 21 = 13 + 21$$

$$\frac{2a}{2} = \frac{34}{2}$$

$$a = 17$$

∴ Sean is 17 years old
Ricky is 4 years old

2. a) The sum of two numbers is 73.
i) Use the table to show possible numbers.
ii) Determine twice the second number.
iii) Determine the first number plus twice the second number.
b) Use the table to help solve the following problem:

| First Number | Second Number | Twice the Second Number | The First Plus Twice the Second |
|--------------|---------------|-------------------------|---------------------------------|
| 1 | 72 | 2×72 | $1 + 2 \times 72$ |
| 2 | 71 | 2×71 | $2 + 2 \times 71$ |
| 10 | 63 | 2×63 | $10 + 2 \times 63$ |
| n | $73 - n$ | $2(73 - n)$ | $n + 2(73 - n)$ |

The sum of two numbers is 73. The first number plus twice the second number is 118. Determine the two numbers.

Let "n" rep 1st #

| 1 st | 2 nd |
|-----------------|-----------------|
| n | $73 - n$ |

$$n + 2(73 - n) = 118$$

$$n + 146 - 2n = 118$$

$$146 - n = 118$$

$$-n = 118 - 146$$

$$-n = -28$$

$$n = 28$$

∴ The numbers are 28 and $73 - 28 = 45$

p.35

4. a) The sum of two numbers is 85. Twice one number plus four times the other is 218. Determine the numbers.
- b) One number is 25 more than another. Twice the larger is 5 more than 7 times the smaller number. Determine the numbers.
- c) The sum of two numbers is 125. Five times one of the numbers minus three times the other is 297. Determine the numbers.

a. Let "n" rep the num.

| 1 st | 2 nd |
|-----------------|-----------------|
| n | 85-n |

$$2n + 4(85-n) = 218$$

$$2n + 340 - 4n = 218$$

$$-2n + 340 = 218 - 340$$

$$\frac{-2n}{-2} = \frac{-122}{-2}$$

$$\boxed{n = 61}$$

∴ The numbers are 61 and $85 - 61 = 24$

b. Let "n" rep the first number

| 1 st | 2 nd |
|-----------------|-----------------|
| n | n+25 |

$$2(n+25) = 7n + 5$$

$$2n + 50 = 7n + 5 - 5$$

$$2n + 45 - 2n = 7n - 2n$$

$$\frac{45}{5} = \frac{5n}{5}$$

$$\boxed{n = 9}$$

∴ The numbers are 9 and 34

c. Let "n" rep the first number

| 1 st | 2 nd |
|-----------------|-----------------|
| n | 125-n |

$$5n - 3(125-n) = 297$$

$$5n - 375 + 3n = 297$$

$$8n - 375 = 297 + 375$$

$$\frac{8n}{8} = \frac{672}{8}$$

$$n = 84$$

∴ The numbers are 81 and $125 - 81 = 45$