Consecutive Integer Problems

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

![Consecutive Integer Problems Table]

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  
e) 25, 26, 27, 28  
h) 72, 74, 76  
c) 341, 342, 343  
f) −25, −24, −23, −22, −21  
i) 57, 58, 59  
d) 121, 122, 123, 124  
g) 11, 13, 15
b. Let $n$, $n+1$, $n+2$ represent the numbers.

\[
\begin{align*}
n + (n+1) + (n+2) &= 246 \\
n + n+1 + n+2 &= 246 \\
3n + 3 &= 246 \\
3n &= 243 \\
\frac{3n}{3} &= \frac{243}{3} \\
\boxed{n = 81}
\end{align*}
\]

\[\therefore \text{The numbers are } 81, 82, 83\]

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

\[
\begin{align*}
n + n+1 + n+2 &= 1026 \\
3n + 3 &= 1026 \\
3n &= 1023 \\
\frac{3n}{3} &= \frac{1023}{3} \\
\boxed{n = 341}
\end{align*}
\]

\[\therefore \text{The numbers are } 341, 342, 343\]

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

\[
\begin{align*}
n + (n+1) + (n+2) + (n+3) &= 490 \\
4n + 6 &= 490 \\
4n &= 484 \\
\frac{4n}{4} &= \frac{484}{4} \\
\boxed{n = 121}
\end{align*}
\]

\[\therefore \text{The numbers are } 121, 122, 123, 124\]

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

\[
\begin{align*}
n + (n+1) + (n+2) + (n+3) + (n+4) &= -115 \\
5n + 10 &= -115 \\
5n &= -125 \\
\frac{5n}{5} &= \frac{-125}{5} \\
\boxed{n = -25}
\end{align*}
\]

\[\therefore \text{The numbers are } -25, -24, -23, -22, -21\]
g. Let \( n, n+2, n+4 \) be the #s.
\[ n + n + 2 + n + 4 = 39 \]
\[ 3n + 6 - 6 = 39 - 6 \]
\[ 3n = \frac{33}{3} \]
\[ n = 11 \]

\[ \therefore \text{The numbers are 11, 13, 15} \]

h. Let \( n, n+2, n+4 \) rep. the #s.
\[ n + n + 2 + n + 4 = 222 \]
\[ 3n + 6 - 6 = 222 - 6 \]
\[ 3n = \frac{216}{3} \]
\[ n = 72 \]

\[ \therefore \text{The numbers are 72, 74, 76} \]

i. Let \( n, n+1, n+2 \) rep. the #s.
\[ 2n + 3(n+1) + 2(n+2) = 406 \]
\[ 2n + 3n + 3 + 2n + 4 = 406 \]
\[ 7n + 7 - 7 = 406 - 7 \]
\[ 7n = \frac{399}{7} \]
\[ n = \frac{57}{7} \]

\[ \therefore \text{The numbers are 57, 58, 59} \]

u. Let \( n, n+2, n+4, n+6 \) rep. the numbers.

Method and sub 2 for \( n \)

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

\[ (2 + 4) - 2(6) = 6 - 12 = -6 \]

Method or

\[ 2 = \frac{(n + n + 2) - 2(n + 4)}{2} \]
\[ = 2n + 2 - 2n - 8 \]
\[ = -6 \]
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:

   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” represent Sean’s age

   \[
   \begin{align*}
   \text{Sean} & \quad \text{Ricky} \\
   a & \quad 21 - a \\
   \end{align*}
   \]

   \[
   a - (21 - a) = 13
   \]

   \[
   a - 21 + a = 13
   \]

   \[
   2a - 21 = 13 + 21
   \]

   \[
   \frac{2a}{2} = \frac{34}{2}
   \]

   \[
   a = 17
   \]

   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:

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

   \[
   \begin{align*}
   \text{First Number} & \quad \text{Second Number} \\
   1 & \quad 72 \\
   2 & \quad 71 \\
   10 & \quad 63 \\
   n & \quad 73-n \\
   \end{align*}
   \]

   First Number + Second Number = 73
   First Number + 2\times Second Number = 118

   \[
   \begin{align*}
   n + 72 & = 118 \\
   144 - 2n & = 118 \\
   146 - n & = 118 \\
   \frac{n}{2} & = -28 \\
   n & = -56
   \end{align*}
   \]

   The numbers are 28 and 73-28 = 45
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.

\[\begin{align*}
\text{a) Let } & \quad n \text{ rep. the num.} \\
\text{1st} & \quad 2nd \\
n & \quad 85-n \\
2n + 4(85-n) &= 218 \\
2n + 340 - 4n &= 218 \\
-2n + 340 &= 218 \\
-2n &= 340 - 218 \\
-2n &= 122 \\
n &= \frac{-122}{-2} \\
n &= 61
\end{align*}\]

\[\begin{align*}
\text{b) Let } & \quad n \text{ rep. the first number} \\
\text{1st} & \quad 2nd \\
n & \quad n+25 \\
2(n+25) &= 7n + 5 \\
2n + 50 &= 7n + 5 - 5 \\
2n + 45 &= 7n - 2n \\
\frac{4n}{5} &= \frac{5n}{5} \\
n &= 9
\end{align*}\]

\[\begin{align*}
\text{c) Let } & \quad n \text{ rep. the first number} \\
\text{1st} & \quad 2nd \\
n & \quad 125-n \\
5n - 3(125-n) &= 297 \\
5n - 375 + 3n &= 297 \\
8n - 375 &= 297 + 375 \\
\frac{8n}{8} &= \frac{672}{8} \\
\boxed{n &= 84}
\end{align*}\]