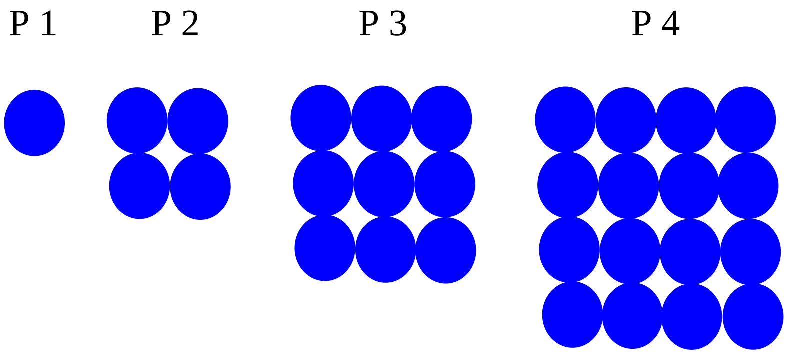
Memo 2019-8ƐB-00006(4)

(1) Consider the following patterns:



(a) Write down a sequence which represents the number of circles in each pattern.

$\mathbf{1\ ;\ 4\ ;\ 9\ ;\ 16\ ;}$ ... ...

(b) Write the sequence in (a) in words.

The complete squares.

(c) Write a general rule for the sequence in (a).

$\mathbf{T}_n = n^2$

(d) How many circles will there be in pattern 8?

$\mathbf{T}_n = n^2$

$\mathbf{T}_8 = 8^2$

$\mathbf{T}_8 = 64$

$\therefore$ **In pattern 8 there will be 64 circles.**

(e) Which pattern will consist of 121 circles?

$\mathbf{T}_n = n^2$

$121 = n^2$

$\therefore \sqrt{121} = n$

$\therefore n = 11$

$\therefore$ **In pattern 11 there will be 121 circles.**

(2) Consider the following sequence and answer the questions: $\frac{2}{7}$; $\frac{5}{3}$; $\frac{8}{-1}$; $\frac{11}{-5}$; .....

(a) Write down the 5th and 6th terms.

..... ; $\frac{14}{-9}$ $\quad\therefore\ T_5 = \frac{14}{-9}$

(b) Write an algebraic rule to describe the pattern sequence.
Hint: The numerator and denominator have different rules.

$$T_n = \frac{3n - 1}{-4n + 11}$$

(c) Calculate the 25th term.

$$T_n = \frac{3n - 1}{-4n + 11}$$

$$\therefore\ T_{25} = \frac{3(25) - 1}{-4(25) + 11}$$

$$\therefore\ T_{25} = \frac{75 - 1}{-100 + 11}$$

$$\therefore\ T_{25} = \frac{74}{-89}$$

(d) For which term in the sequence will the numerator be equal to 89?

$\therefore\ T_n = 3n - 1 \quad \rightarrow \quad$ **for the numerator**

$$\therefore\ 89 = 3n - 1$$

$$\therefore\ 89 + 1 = 3n$$

$$\therefore\ 3n = 90$$

$$\therefore\ n = \frac{90}{3}$$

$$\therefore\ n = 30$$

∴ For term 30, the numerator will be 89.