**MORE QUADRATIC PATTERNS**

1. For the sequence 8; 20; 38; 62; ….determine:
2. The general term $T\_{n}$
3. The 20th term of the sequence

Solution: a. 8 20 38 62

 12 18 24 First difference

 6 6 Second difference $a=\frac{6}{2}=$ **3** $12=3a+b$ $12-3\left(3\right)=b$

 $b=3$ $8=a+b+c$ $8=3+3+c$ $8-6=c$ $2=c$

**Therefore:** $T\_{n}=3n^{2}+3n+2$

1. $T\_{20}=3\left(20\right)^{2}+3\left(20\right)+2$

$=1262$

**EXERCISE:** For the sequence 1; 6; 15; 28……determine:

1. The general term
2. the 10th term of the sequence

**QUADRATIC PATTERNS INVOLVING DIAGRAMS**

1. Consider the following set of diagrams. Figure 1 consists of 3 circles, Figure 2 consists of 11 circles and Figure 3 consists of 23 circles.

**Figure 1 Figure 2 Figure 3 Figure 4**

 1.1 If this pattern is continued, determine the number of circles that will appear

in Figure 5. (2)

 1.2 If this pattern is continued, determine the general formula for the number of

circles which will appear in the  figure in this pattern. (4)

SOLUTION:

1.1 3 11 23 39 59

 8 12 16 20 First difference

 4 4 4 Second difference

1.2 $a=\frac{4}{2}=2$ $3a+b=8$ $a+b+c=3$

 $3\left(2\right)+b=8$ $2+2+c=3$

 $b=8-6$ $c=3-4$

 $b=2$ $c=-1$

1.2(cont)

Therefore: $T\_{n}=2n^{2}+2n-1$

**EXERCISE**



If the number of **black squares** in the above diagram was following a **quadratic** pattern, determine:

* 1. the number of black squares in **Fig 4.**
	2. the **general term** for the number of squares in the different figures.
	3. the number of squares in **Fig 10.**