**NUMBER PATTERNS**

Quadratic Patterns

The general quadratic pattern: $T\_{n}=an^{2}+bn+c$

Finding the $a, b and c$

1. $a=\frac{second difference }{2}$
2. $First term of first difference=3a+b$ [Make $b$ the subject]
3. $First term of the pattern=a+b+c$ [Make C the subject]

Example

Determine the general term of the sequence: 8; 20; 38; 62; …

Solution: 8 20 38 62

 First difference 12 18 24

Second difference 6 6

1. a =$\frac{second difference}{2}=$ $\frac{6}{2}=3$
2. $First term of first difference=3a+b$

$$12=3\left(3\right)+b $$

 $b=6$

1. $First term of pattern=a+b+c$

 $8=3+6+c$

$$c=-1$$

Therefore: $T\_{n}=an^{2}+bn+c=3n^{2}+6n-1$

**EXERCISE**

For the following patterns, find the general term ($T\_{n}$)

1. 3; 6; 10; 15; 21;…
2. -9; -3; 10; 30; 57; …