

FE Review Packet:

Find general term

5, 11, 21, 35, 53

↘ ↘ ↘ ↘
+6 +10 +14 +18

$$n=1 \Rightarrow 5$$

$$n=2 \Rightarrow 11$$

$$n=3 \Rightarrow 21$$

$$n=4 \Rightarrow 35$$

$$n=5 \Rightarrow 53$$

Subst $n=1$ into an^2+b , then $n=2$

$$n=1 \Rightarrow a \cdot 1^2 + b = 5 \quad \leftarrow \text{1st term}$$

$$n=2 \Rightarrow a \cdot 2^2 + b = 11 \quad \leftarrow \text{2nd term.}$$

This gives two equations and two unknown variables.

$$\begin{cases} a + b = 5 & (A) \\ 4a + b = 11 & (B) \end{cases}$$

a system! solve by substitution or elimination.

$$\begin{array}{rcl} (A) \times (-1) : & -a - b = -5 & \\ & 4a + b = 11 & \\ \hline & 3a & = 6 \\ & a = 2 & \end{array}$$

subst $a=2$ back:

$$\begin{aligned} 2 + b &= 5 \\ b &= 3 \end{aligned}$$

$$a_n = an^2 + b \Rightarrow \boxed{a_n = 2n^2 + 3}$$

$$\begin{array}{ll} \text{check: } n=1 & 2(1)^2 + 3 = 5 \quad \checkmark \\ n=2 & 2(2)^2 + 3 = 11 \quad \checkmark \\ n=3 & 2(3)^2 + 3 = 21 \quad \checkmark \\ n=4 & 2(4)^2 + 3 = 35 \quad \checkmark \end{array}$$

Three strategies

1) Every term is the same # added over and over

2) Every term is the same # multiplied over and over

3) Every term is an increasing amount added each time

$$a_n \Rightarrow \underline{an^2 + b}$$