Sigma Notation
Ex

$$
\begin{aligned}
& \sum_{r=2}^{6} r=2+3+4+5+6 \\
& \sum_{r=1}^{n} r=1+2+3+\ldots+n-1+n
\end{aligned}
$$

Exercise $3 F$
1 a) $\quad \begin{aligned} \sum_{r=1}^{5}(3 r+1) & =4+7+10+13+16 \\ & =50\end{aligned}$
b)

$$
\begin{aligned}
\sum_{r=1}^{6} 3 r^{2} & =3+12+27+48+75+108 \\
& =273
\end{aligned}
$$

2 a) $2+4+6+8=\sum_{r=1}^{4} 2 r$
b) $2+6+18+54+162=\sum_{r=1}^{5}$

$$
\sum_{r=1}^{5} 2 \times 3^{r-1}
$$

c)

$$
\begin{aligned}
& 6+4.5+3+1.5+0-1.5 \\
& \sum_{r=1}^{6}(7.5-1.5 r)
\end{aligned}
$$

3 a) $7+13+19+\ldots+157$
Ap $a=7$

$$
d=6
$$

$$
\sum_{r=1}^{26}(1+6 r)
$$

$$
\begin{gathered}
n^{t^{n}} \operatorname{tern}=157 \\
a+(n-1) d=157 \\
7+(n-1)(6)=157 \\
6(n-1)=150 \\
n-1=25 \\
n=26
\end{gathered}
$$

Bb) $\frac{1}{3}+\frac{2}{15}+\frac{4}{25}+\cdots+\frac{64}{46875}$

$$
\sum_{r=1}^{7} \frac{1}{3} \times\left(\frac{2}{5}\right)^{r-1}
$$

Recurrence Relations
A recurrence relation of the farm $u_{n+1}=f\left(u_{n}\right)$ defines each term of a
sequence as a function of the previous term

Exercise $3 G$
( a) $\quad u_{n+1}=u_{n}+3, \quad u_{1}=1$

$$
\begin{array}{ll}
u_{1}=1 \\
u_{2} & =1+3=4
\end{array} \quad u_{3}=4+3=7 \quad v_{4}=7+3=10
$$

2 a) $\quad u_{n+1}=u_{n}+2 \quad v_{1}=3$
g)

$$
\begin{aligned}
& 0,1,2,5,26 \\
& u_{n+1}=u_{n}^{2}+1, \quad u_{1}=0
\end{aligned}
$$

h) $26,14,8,5,3.5$

$$
\begin{aligned}
& U_{n+1}=\frac{1}{2} U_{n}+1 U_{1}=26 \\
& u_{n}=2 n-1 \\
& u_{1}=2-1=1 \\
& u_{2}=4-1=3 \\
& u_{3}=6-1=5 \\
& u_{4}=8-1
\end{aligned}
$$

3 a)
f)

$$
\begin{aligned}
& u_{n}=3^{n}-1 \\
& u_{1}=2 \\
& u_{2}=8 \\
& u_{3}=26 \\
& u_{4}=80
\end{aligned} \quad U_{n+1}=3 u_{n}+2 \quad U_{1}=2
$$

Homework
Exercise $3 F$
Lust part of $Q(1,2,3,4,5$
Exercise $] G$ Parts $b, c, d$ of $Q 1,2,3$.

