$$
\begin{array}{ll}
\text { (2) } & 30-5+\frac{5}{6} \cdots \\
& S_{7}=? \\
r=\frac{-1}{6} & S_{7}=\frac{30((-1) \cdot-1)}{\frac{-1}{6}-1} \\
a=30 & S_{7}=\frac{30\left(\frac{-1}{279936}-1\right)}{\frac{-1}{6}-\frac{6}{6}} \\
n=7 & S_{7}=\frac{30\left(\frac{-1}{279936}-\frac{279936}{279936}\right)}{\frac{-7}{6}-} \\
& S_{7}=\frac{30}{1}\left(\frac{-279937}{279936}\right) \times \frac{-6}{7} \\
& S_{7}=\frac{50388660}{195955 \partial} \\
& S_{7}=\frac{199955}{7776} \text { or } 25 \frac{5555}{7776}
\end{array}
$$

(a)

$$
\begin{array}{ll}
S_{7}=1093 & S_{n}=\frac{a\left(r^{n}-1\right)}{r-1} \\
r=\frac{1}{3} & 1093=\frac{a\left(\left(\frac{1}{3}\right)^{7}-1\right)}{\frac{1}{3}-1} \\
n=7 & 1093=\frac{a\left(\frac{1}{2187}-\frac{2187}{2187}\right)}{\frac{1}{3}-\frac{3}{3}} \\
a=? & 1093=a\left(\frac{-2186}{2187}\right) \times-\frac{3}{2} \\
& 1093=2 \frac{6558 a}{4374} \\
& 6558 a=4780782 \\
& a
\end{array}
$$

b) $t_{4}=$ ?

$$
r=\frac{1}{3}
$$

$$
\begin{aligned}
& t_{4}=(729)\left(\frac{1}{3}\right)^{4-1} \\
& t_{4}=729\left(\frac{1}{27}\right) \\
& t_{4}=\frac{729}{27} \\
& t_{4}=27
\end{aligned}
$$

$$
\begin{array}{ll}
a=729 & t_{4}=729\left(\frac{1}{27}\right) \\
r=1 &
\end{array}
$$

$$
n=4
$$

(2)a)

$$
\text { (2) } \begin{array}{rlrl}
n & =? & t_{n} & =a+(n-1) d \\
a & =3 & 39 & =3+(n-1) 4 \\
d & =4 & 36 & =4 n-4 \\
t_{n} & =39 & 40 & =4 n \\
& 10 & =n \\
3,7,11,15,19,23,27,31,35,39
\end{array}
$$

(1) b) $\quad t_{9}=-6 \quad t_{18}=-12$

$$
\begin{array}{ll}
t_{9}=a+8 d & t_{12}=a+11 d \\
a+8 d=-6 & a+11 d=-12
\end{array}
$$

$$
\begin{aligned}
a+11 d=-12 \\
\Leftrightarrow+8 d=-6 \\
3 d=-6 \\
d=-2
\end{aligned}\left\{\begin{array}{ll}
a+8(-2)=-6 & t_{n}=a+(n-1) \\
a-16=-6 \\
a=10
\end{array} \begin{array}{l}
t_{n}=10+(n-1 \\
t_{n}=10-2 n+2 \\
t_{n}=12-2 n
\end{array}\right.
$$

(6)

$$
\begin{array}{ll}
\text { b) } \begin{array}{ll}
t_{5}=8 & t_{10}=\frac{1}{4} \quad t_{3}=? \\
t_{5}=a r^{4} & t_{10}=a r^{a} \\
a r^{4}=8 & a r^{9}=\frac{1}{4} \\
a r^{9}=\frac{1}{4} \\
\hline a r^{4}=8 \\
r^{5}=\frac{1}{30} \\
r=1 & a\left(\frac{1}{2}\right)^{4}=8 \\
t_{3}=(128)\left(\frac{1}{6}\right. \\
a\left(\frac{1}{16}\right)=8 & t_{3}=128\left(\frac{1}{4}\right. \\
\frac{a}{16}=8 & t_{3}=32
\end{array}
\end{array}
$$

$$
\begin{aligned}
& \text { (1) b) } 2+\frac{2}{3}+\frac{2}{9}+\frac{2}{27}+\cdots \\
& a=2 \\
& r=\frac{1}{3} \\
& S_{n}=\frac{2\left(\frac{1}{3}^{n}-1\right)}{\frac{1}{3}-1} \\
& =\frac{2\left(\frac{1^{n}}{3}-1\right)}{-\frac{2}{3} j} \\
& =\nsim\left(\frac{1^{n}}{}{ }^{n}-1\right) \times \frac{3}{-\gamma} \\
& =-3\left(\frac{1}{3}^{n}-1\right)
\end{aligned}
$$

$$
\begin{aligned}
& \text { (3) c) } \begin{aligned}
& 81+27+9 \ldots \\
& a=81 \quad S_{6}=\frac{81\left(\left(\frac{1}{3}\right)^{6}-1\right)}{\frac{1}{3}-1} \\
& r=\frac{1}{3} \\
& n=6=\frac{81\left(\frac{1}{729}-\frac{729}{729}\right)}{\frac{1}{3}-\frac{3}{3}} \\
&=\frac{81\left(\frac{-728}{7299}\right)}{\frac{-2}{3}} \\
& \frac{-2184}{-18}=-\frac{728}{964} \times \frac{21}{-21} \\
&=\frac{364}{3}=121 / 3
\end{aligned}
\end{aligned}
$$

(2)

$$
\begin{aligned}
& \text { (2) } 30-5+\frac{5}{6}-\cdots \\
& \begin{aligned}
a=30 \quad S_{7} & =\frac{\left.30\left(\frac{(-1}{6}\right)^{7}-1\right)}{\frac{-1}{6}-1} \\
\begin{aligned}
& \Gamma=\frac{-1}{6} \\
& S_{7}=? \\
& n=7
\end{aligned} & =\frac{30\left(\frac{-1}{279936}-\frac{279936}{279936}\right)}{\frac{-1}{6}-\frac{6}{6}} \\
& =\frac{30\left(\frac{-279937}{279936}\right)}{\frac{-7}{6}} \\
& =\frac{-8398110}{279936} \times \frac{6}{-7} \\
& =\frac{-50388660}{-1959552} \\
& =\frac{199955}{7776}
\end{aligned}
\end{aligned}
$$

or $25 \frac{5555}{m 76}$
(6)

$$
\begin{array}{rlrl}
S_{7}=1093 & 1093 & =\frac{a\left(\left(\frac{1}{3}\right)^{7}-1\right)}{\frac{1}{3}-1} \\
r=\frac{1}{3} & & 1093 & =\frac{a\left(\frac{1}{2187}-\frac{2187}{2187}\right)}{\frac{1}{3}-\frac{3}{3}} \\
a=? & & & \\
1093 & =\frac{a\left(\frac{-2186}{2187}\right)}{\frac{-2}{3}} \\
1093 & =\frac{-2186 a}{2187} \times \frac{3}{-2} \\
1093 & =* \frac{6558 a}{44374} \\
6558 a & =4780782 \\
a & =729
\end{array}
$$

$$
\text { b) } \begin{aligned}
t_{1} & =729 \quad 729+243+81+27 \ldots \\
t_{2} & =243 \\
t_{3} & =81 \\
t_{4} & =27
\end{aligned}
$$

(6)

$$
\begin{array}{rlrl}
S_{7}=1093 & S_{n} & =\frac{a\left(r^{n}-1\right)}{r-1} \\
r=\frac{1}{3} & 1093 & =\frac{\left.a\left(\frac{1}{3}\right)^{7}-1\right)}{\frac{1}{3}-1} \\
a=? & 1093 & =\frac{a\left(\frac{1}{2187}-\frac{2187}{2187}\right)}{\frac{1}{3}-\frac{3}{3}} \\
n=7 & 1093 & =\frac{a\left(\frac{-2186}{2187}\right)}{\frac{-2}{3}} \\
1093 & =\frac{-2186 a}{2187} \times \frac{3}{-2} \\
1093 & =\frac{-6558 a}{-4374} \\
-6558 a & =-4780782 \\
a & =729
\end{array}
$$

b) $t_{n}=a r^{n-1}$

$$
\begin{aligned}
& t_{4}=729\left(\frac{1}{3}\right)^{4-1} \\
& t_{4}=729\left(\frac{1}{3}\right)^{3} \\
& t_{4}=729\left(\frac{1}{27}\right) \\
& t_{4}=27
\end{aligned}
$$

Ex 10.9
(5) b) (1) $\frac{5}{2}+\frac{25}{4}+\ldots+\frac{15625}{64}$

$$
\begin{aligned}
& S_{n}=? \\
& a=1 \\
& r=\frac{5}{2} \\
& t_{n}=\frac{15006}{64}
\end{aligned}
$$

$$
t_{n}=a r^{n-1}
$$

$$
\frac{15625}{64}=\left(\frac{5}{2}\right)^{n-1}
$$

$$
\begin{aligned}
\left(\frac{5}{2}\right)^{6} & =\left(\frac{5}{2}\right)^{n-1} \\
6 & =n-1 \\
7 & =n
\end{aligned}
$$

$$
\text { Find } \begin{aligned}
S_{7}: \quad \begin{aligned}
S_{7} & =\frac{1\left(\left(\frac{5}{2}\right)^{7}-1\right)}{\frac{5}{2}-1} \\
& =\frac{1\left(\frac{78125}{128}-\frac{128}{128}\right)}{\frac{5}{2}-\frac{2}{2}} \\
& =\left(\frac{77997}{128}\right) \div\left(\frac{3}{2}\right) \\
& =\frac{77997}{128} \times \frac{2}{3} \\
& =\frac{155994}{384}=\frac{25999}{64}
\end{aligned}
\end{aligned}
$$

$$
\text { Ex } 10.9
$$

(2)

$$
\begin{aligned}
& S_{1}=\text { ? } \\
& \text { (30)- } 5+\frac{5}{6}-\cdots \\
& n=7 \\
& a=30 \\
& r=-\frac{5}{30}=\frac{-1}{6} \\
& s_{1}=\frac{30\left(\left(-\frac{1}{6}\right)^{7}-1\right)}{-\frac{1}{6}-1} \\
& =\frac{30\left(\frac{-1}{(79936}-\frac{279936}{279936}\right)}{\frac{-1}{6}-\frac{6}{6}} \\
& =30\left(\frac{-279937}{279936}\right)\left(-\frac{6}{7}\right) \\
& =\frac{50388660}{1959552} \\
& =\frac{199955}{776}
\end{aligned}
$$

$$
\begin{aligned}
& \text { (1) } a=3 \\
& t_{1}=192 \\
& S_{8}=? \\
& r= \pm 2
\end{aligned}
$$

Find $r$ :

$$
\begin{aligned}
& t_{n}=a r^{n-1} \\
& 192=3 r^{7-1} \\
& \frac{192}{3}=\frac{3 r^{6}}{3} \\
& 64=r^{6} \\
& \pm 2=r
\end{aligned}
$$

$$
\begin{aligned}
& \text { If } r=\partial \\
& S_{8}=\frac{\left.3(2)^{8}-1\right)}{\partial-1} \\
&=\frac{3(256-1)}{1} \\
&=3(255) \\
&=765
\end{aligned}
$$

Review

$$
\begin{aligned}
& \text { (10) } \begin{array}{rl}
t_{7}=192 & a=t_{1}=3 \\
t_{7}=a r^{7-1} & S_{8}=? \\
t_{7}=a r^{6} & s_{8}=\frac{3\left(\partial^{8}-1\right)}{2-1} \\
a r^{6}=192 & =\frac{3(256-1)}{1} \\
3 r^{6}=192 & =3 \\
r^{6}=64 & =3(255) \\
r= \pm 2 & =765
\end{array}= \\
&= \\
&==
\end{aligned}
$$

