Geometric Sequences

1. $a = 24 \qquad ar = 18 \Rightarrow r = \frac{18}{24} = 0.75$

$$S_\infty = \frac{24}{1-0.75} = \underline{\underline{96}}$$

2. $a = 6$

$$S_\infty = \frac{6}{1-r} = 10$$

$$\Rightarrow 6 = 10 - 10r$$

$$\Rightarrow 10r = 4$$

$$\Rightarrow \underline{\underline{r = 0.4}}$$

3. (i) $u_4 = 5 \times 0.6^3$

$$= \underline{\underline{1.08}}$$

(ii) $S_\infty = \frac{5}{1-0.6} = \underline{\underline{12.5}}$

4. $a = 30$

$r = 0.8$

(i) $30 \times 0.8^{19} = \underline{\underline{0.432}}$

(ii) $S_{20} = \frac{30(1-0.8^{20})}{1-0.8}$

$$= \underline{\underline{148}} \quad (3 \text{ s.f.})$$

(iii) $S_\infty = \frac{30}{1-0.8} = \underline{\underline{150}}$