

$$6. \quad n^{\text{th}} \text{ term} = \frac{10n-2}{3}$$

$$n=1 \quad \frac{10-2}{3} = 4a \quad \Rightarrow 8 = 12a \Rightarrow a = \frac{2}{3}$$

$$n=2 \quad \frac{20-2}{3} = 9a \quad \Rightarrow 18 = 27a \Rightarrow a = \frac{2}{3}$$

$$7. \quad n=7 \quad \frac{2n^2+7}{3n^2-2} = \frac{105}{145} = \frac{21}{29}$$

$$8. \quad \text{as } n \rightarrow \infty \quad \frac{2n^2+7}{3n^2-2} \rightarrow \frac{2n^2}{3n^2} = \frac{2}{3}$$

since the 7 and 2 become insignificant.

$$9. \quad n^{\text{th}} \text{ term} = 5n-3$$

$$\begin{aligned} \text{New sequence} &= (5n-3)^2 + 1 \\ &= 25n^2 - 30n + 10 \\ &= 5(5n^2 - 6n + 2) \end{aligned}$$

Hence a multiple of 5.