1.5) Sums of series

Worked example	Your turn
$$\frac{5}{e^{2i\theta}-1}$$	$$\frac{3e^{i\theta}}{e^{4i\theta}-1}$$ $$\frac{3e^{-i\theta}}{2i\sin 2\theta}$$
$$\frac{2e^{i\theta}}{e^{6i\theta}-1}$$	$$\frac{11}{e^{\frac{i\theta}{3}}-1}$$ $$\frac{11e^{-\frac{i\theta}{6}}}{2i\sin\frac{\theta}{6}}$$
$$\frac{7}{e^{\frac{i\theta}{5}}-1}$$	

Worked example	Your turn
$S = e^{i\theta} + e^{2i\theta} + e^{3i\theta} + \cdots + e^{6i\theta}$, for $\theta \neq 2n\pi$, where n is an integer. a) Show that $S = \dfrac{e^{\frac{7i\theta}{2}} \sin 3\theta}{\sin\frac{\theta}{2}}$	$S = e^{i\theta} + e^{2i\theta} + e^{3i\theta} + \cdots + e^{8i\theta}$, for $\theta \neq 2n\pi$, where n is an integer. a) Show that $S = \dfrac{e^{\frac{9i\theta}{2}} \sin 4\theta}{\sin\frac{\theta}{2}}$ Shown

Worked example	Your turn
$S = e^{i\theta} + e^{2i\theta} + e^{3i\theta} + \cdots + e^{6i\theta}$, for $\theta \neq 2n\pi$, where n is an integer.	$S = e^{i\theta} + e^{2i\theta} + e^{3i\theta} + \cdots + e^{8i\theta}$, for $\theta \neq 2n\pi$, where n is an integer.
a) Show that $S = \frac{e^{\frac{7i\theta}{2}} \sin 3\theta}{\sin\frac{\theta}{2}}$	a) Show that $S = \frac{e^{\frac{9i\theta}{2}} \sin 4\theta}{\sin\frac{\theta}{2}}$
Let $P = \cos\theta + \cos 2\theta + \cos 3\theta + \cdots + \cos 6\theta$ and $Q = \sin\theta + \sin 2\theta + \cdots + \sin 6\theta$	Let $P = \cos\theta + \cos 2\theta + \cos 3\theta + \cdots + \cos 8\theta$ and $Q = \sin\theta + \sin 2\theta + \cdots + \sin 8\theta$
(b) Use your answer to part **a** to show that $P = \cos\frac{7\theta}{2}\sin 3\theta \ \ cosec\frac{\theta}{2}$ and find similar expressions for Q and $\frac{Q}{P}$	(b) Use your answer to part **a** to show that $P = \cos\frac{9\theta}{2}\sin 4\theta \ \ cosec\frac{\theta}{2}$ and find similar expressions for Q and $\frac{Q}{P}$
	Shown $Q = \sin\frac{9\theta}{2}\sin 4\theta \ \ cosec\frac{\theta}{2}$ $\frac{Q}{P} = \tan\frac{9\theta}{2}$