

1) Rewrite the following as powers of $\sec\theta$, $\operatorname{cosec}\theta$ or $\cot\theta$

a) $\frac{1}{\sin^3 \theta}$ b) $\sqrt{\frac{4}{\tan^6 \theta}}$ c) $\frac{1}{2 \cos^2 \theta}$ d) $\frac{1 - \sin^2 \theta}{\sin^2 \theta}$

2) Write down the value(s) of $\cot x$ in each of the following equations

a) $5 \sin x = 4 \cos x$ b) $\tan x = -2$ c) $3 \frac{\sin x}{\cos x} = \frac{\cos x}{\sin x}$

3) Simplify the following expressions

a) $\sin\theta \cot\theta$ b) $\tan\theta \cot\theta$ c) $\tan 2\theta \operatorname{cosec} 2\theta$
d) $\cos\theta \sin\theta (\cot\theta + \tan\theta)$

4) True or False? Set these questions out as proofs ($LHS \equiv \dots \equiv \dots \equiv RHS$) to see if they are True or False

a) $\cos\theta + \sin\theta \tan\theta \equiv \sec\theta$ b) $\cot\theta + \tan\theta \equiv \operatorname{cosec}\theta \sec\theta$
c) $\operatorname{cosec}\theta - \sin\theta \equiv \cos\theta \tan\theta$ d) $(1 - \cos x)(1 + \sec x) \equiv \sin x \cot x$

5) Solve the following equations for values of θ in the interval $0^\circ \leq \theta \leq 360^\circ$. Give your answers to 3 s.f. where necessary.

a) $\sec\theta = \sqrt{2}$ b) $\operatorname{cosec}\theta = -3$ c) $5 \cot\theta = -2$ d) $\operatorname{cosec}\theta = 2$

6) Solve the following equations for values of θ in the interval $-180^\circ \leq \theta \leq 180^\circ$. Give your answers to 3 s.f. where necessary.

a) $\operatorname{cosec}\theta = 1$ b) $\sec\theta = -3$ c) $\cot\theta = 3.45$ d) $2 \operatorname{cosec}^2\theta - 3 \operatorname{cosec}\theta = 0$