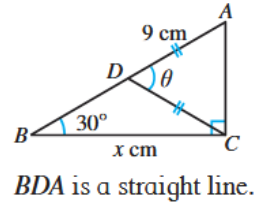


MSC F3 Miscellaneous Ex on trigo relations

Miscellaneous Exercise on Trigonometric relations

1. (a) Find the value of θ and show that $\triangle ACD$ is equilateral.
(b) Hence, find the value of x .



2. Find the value of θ if $\sin(46^\circ - \theta) = \cos(5\theta - 68^\circ)$.
3. It is given that $\tan \theta = \frac{15}{8}$, without the use of calculators, find the values of
- (a) $\sin \theta$
(b) $\cos \theta$, and hence
(c) $\frac{\tan \theta}{\sin \theta - \cos^2 \theta}$.

4. It is given that $\tan \theta = \frac{2}{5}$, without the use of calculators, find the value of

$$\frac{2\sin^2 \theta - 2\sin(90^\circ - \theta)\cos(90^\circ - \theta)}{5\cos^2 \theta - \sin^2 \theta}.$$

5. Prove that

(a) $\cos^4 \theta - \sin^4 \theta \equiv (\cos \theta - \sin \theta)(\sin \theta + \cos \theta),$

(b) $\frac{1}{1 - \cos \theta} - \frac{1}{1 + \cos \theta} \equiv \frac{2 \tan(90^\circ - \theta)}{\sin \theta}.$

6. If $\frac{\sin^2 \theta}{2 + 7\cos^2 \theta} = \frac{1}{9}$, find the exact values of $\cos \theta$ and $\tan \theta$.

7. (a) Show that $\left(\frac{1}{\cos \theta} + \tan \theta\right)(1 - \sin \theta) \equiv \cos \theta.$

- (b) Is it possible for the value of $\left(\frac{1}{\cos \theta} + \tan \theta\right)(1 - \sin \theta)$ to be greater than $\frac{3}{2}$?

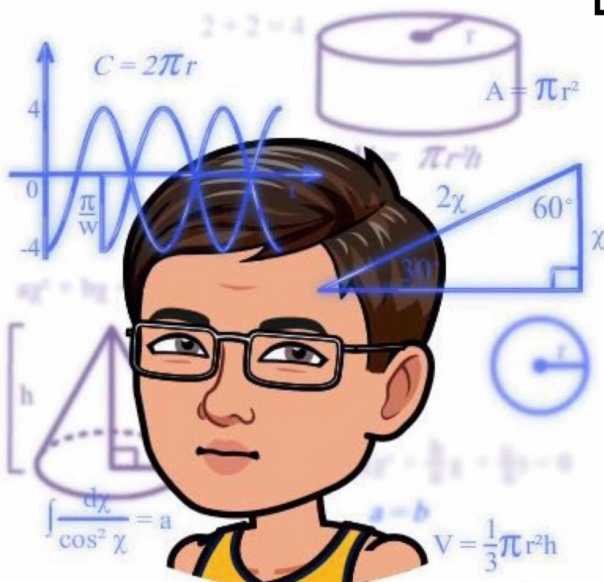
Explain your answer.



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