

Questions: Trigonometric identities (degrees)

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Summary

A selection of questions on trigonometric identities, where angles are measured in degrees.

Before attempting these questions, it is recommended that you read [Guide: Trigonometric identities \(degrees\)](#).

Q1

Using trigonometric identities, find the values of the following expressions:

- 1.1. $2(6 \sin^2(\theta)) + 3(4 \cos^2(\theta)).$
- 1.2. $10(7 \sin^2(\theta)) + 14(5 \cos^2(\theta)).$
- 1.3. $5 \left(\frac{6}{\csc^2(\theta)} \right) + 15 \left(\frac{2}{\sec^2(\theta)} \right).$
- 1.4. $(\cos^2(\theta) - \sin^2(\theta))^2 + 4\sin^2(\theta) \cos^2(\theta)$
- 1.5. $2 \sin(30) \cos(15) + 2 \cos(30) \sin(15)$
- 1.6. $3 \cos(45) \cos(15) - 3 \sin(45) \sin(15)$
- 1.7. $\sin(150) + \sin(30)$
- 1.8. $\cos(150) + \cos(30)$

Q2

Simplify the following expressions:

- 2.1. $\tan(\theta) \cos(-\theta)$
- 2.2. $\tan(-\theta) \csc(-\theta) \sec(-\theta)$
- 2.3. $\tan^2(\theta) + \sin^2(\theta) + \cos^2(\theta)$
- 2.4. $\frac{2 \sin(\theta)}{\cos(\theta)(1 - \tan^2(\theta))}$

$$2.5. \quad \frac{\sin(7\theta) + \sin(3\theta)}{\cos(7\theta) - \cos(3\theta)}$$

$$2.6. \quad \frac{\sin(5\theta) - \sin(\theta)}{\cos(5\theta) + \cos(\theta)}$$

Q3

Using trigonometric identities, answer the following questions:

- 3.1. What is the value of $\cos(210^\circ)$?
- 3.2. What are the values of $\sin(135^\circ)$ and $\sin(225^\circ)$?
- 3.3. If $\sin(50^\circ)$ has the value 0.766 (to 3 decimal places), what is the value of $\cos(130^\circ)$ to three decimal places?

Q4

Using trigonometric identities, find **exact** values of the following:

- 4.1. $\sin(15)$
- 4.2. $\cos(15)$
- 4.3. $\tan(15)$
- 4.4. $\sin(75)$
- 4.5. $\cos(75)$
- 4.6. $\tan(75)$

[After attempting the questions above, please click this link to find the answers.](#)

Version history and licensing

v1.0: initial version created 08/23 by Dzhemma Ruseva as part of a University of St Andrews STEP project.

- v1.1: edited 05/24 by tdhc, and split into versions for both degrees and radians.

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