

HW 2324_F3_CH9_ Trigonometric Relations

Form Three Mathematics Test (2023–2024)

Ch.9 Trigonometric Relations

Class: F . 3 ()

Name: _____ ()

Time Allowed: 35 minutes

Date: 20/3/2024

Mark	/35	Class Average	
Parent's Signature:			

Unless specified, the figures are not necessary drawn to scale.

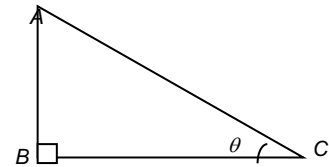
Section A: Multiple Choice (10 marks)

Put the best answer in the spaces provided in the box below.

Question	1	2	3	4	5
Answer					

1. In the figure, $AB = \sqrt{3} BC$. Find θ .

- A. 30°
B. 45°
C. 60°
D. 75°



2. If θ is an acute angle and $\sin^2 \theta = 3 \cos^2 \theta$, then $\theta =$

- A. 30° .
B. 45° .
C. 60° .
D. 90° .

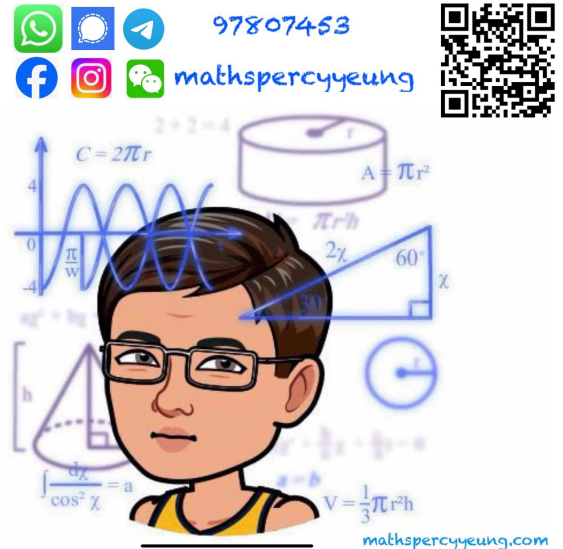
3. $[\cos \theta + \cos (90^\circ - \theta)]^2 - 2 \sin \theta \cos \theta =$

- A. 0
B. 1
C. $\sin \theta + \cos \theta$
D. $\cos \theta - \sin \theta$

4. Which of the following are identities?

- I. $\tan(90^\circ - \theta) \sin \theta = \cos \theta$
II. $\cos^2 \theta - \sin^2 \theta = 2 \cos^2 \theta - 1$
III. $1 + \tan^2 \theta = \frac{1}{\cos^2 (90^\circ - \theta)}$

- A. I and II only
B. I and III only
C. II and III only
D. I, II and III



5. If θ is an acute angle and $\frac{1}{\tan \theta} = \tan(\theta + 32^\circ)$, then $\theta =$
- A. 29° .
B. 30° .
C. 32° .
D. 36° .

Section B: Conventional Questions (25 marks)

6. Find the values of the following expressions without using a calculator.
(Leave your answers in surd form if necessary.) (5 marks)
- (a) $\tan 60^\circ + 2 \cos 30^\circ$ (b) $\frac{\cos 60^\circ \tan 30^\circ}{\sin^2 45^\circ}$

7. It is given that $\cos \theta = 0.25$, where θ is an acute angle. Find the values of $\sin \theta$ and $\tan \theta$ without evaluating θ . (Leave your answers in surd form.) (4 marks)

8. Simplify the following expressions.

(a) $\cos \theta \tan \theta - 2 \sin \theta$

(b) $\sin^2(90^\circ - \theta) + \sin^2 \theta$

(c) $\frac{\sin \theta \cos \theta}{3 - 3 \sin^2 \theta}$

(d) $(\cos \theta + \sin \theta)^2 - 2 \sin \theta \cos \theta.$

(8 marks)

9. Prove the following identities.

(a) $\frac{1}{\sin \theta} \equiv \frac{\tan(90^\circ - \theta)}{\cos \theta}$

(b) $\frac{1}{\sin^2 \theta} + \frac{1}{\sin^2(90^\circ - \theta)} \equiv \frac{\tan^2 \theta}{\sin^4 \theta}$

(5 marks)

10. Prove that $\sqrt{\frac{1-\sin \theta}{1+\sin \theta}} \equiv \frac{1-\sin \theta}{\cos \theta}$ for any acute angle θ . (3 marks)

Section D: Bonus (2 marks) Only answers are required.

11.
Simplify $\frac{\cos^4 \theta - \sin^4 \theta}{\sin \theta + \cos \theta}$.

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