



Attempt questions first; check the separate key afterward. Show steps and draw labelled diagrams where asked.

A. Very short answers - 1 mark each

1. Define $\sin\theta$ in a right triangle.
2. Define $\tan\theta$ in a right triangle.
3. Find $\sin 30^\circ$.
4. Find $\cos 60^\circ$.
5. Find $\tan 45^\circ$.
6. State $\sin^2\theta + \cos^2\theta$.
7. Can $\sin\theta = 5/4$ for a real acute angle?
8. Find $\sec 60^\circ$.

B. Short answers / practice - 2 marks each

9. If $\sin\theta = 3/5$ for acute θ , find $\cos\theta$ and $\tan\theta$.
10. If $\tan\theta = 5/12$, find $\sin\theta$.
11. Evaluate $2\sin 30^\circ + 3\cos 60^\circ$.
12. Evaluate $\sin^2 45^\circ + \cos^2 30^\circ$.
13. Find $\operatorname{cosec} 30^\circ + \cot 45^\circ$.
14. If $\cos\theta = 12/13$, find $\sec\theta$ and $\tan\theta$ for acute θ .
15. Prove $1 + \tan^2\theta = \sec^2\theta$.
16. Prove $1 + \cot^2\theta = \operatorname{cosec}^2\theta$.
17. Evaluate $\tan 30^\circ \tan 60^\circ$.
18. Evaluate $\cos 0^\circ + \sin 90^\circ$.
19. Find $\sin 60^\circ \cos 30^\circ + \cos 60^\circ \sin 30^\circ$.
20. If $3\tan\theta = \sqrt{3}$ and θ is acute, find θ .

C. Application / reasoning - 3 marks each

21. Simplify $(1 - \cos^2\theta)/\sin^2\theta$ where defined.

22. Prove $(\sec\theta - \tan\theta)(\sec\theta + \tan\theta) = 1$.

23. Prove $(1 - \sin\theta)(1 + \sin\theta) = \cos^2\theta$.

24. If $\sin\theta = 8/17$, find all other trigonometric ratios for acute θ .

25. Evaluate $(\sin 30^\circ + \cos 60^\circ)/(\tan 45^\circ + \cot 45^\circ)$.

26. Is $\tan 90^\circ$ defined? Explain.

27. If $\cot\theta = 7/24$ for acute θ , find $\sin\theta$ and $\cos\theta$.

28. Evaluate $4\sin^2 30^\circ + 3\cos^2 60^\circ$.

29. Prove $(1 + \sin\theta)/\cos\theta = \sec\theta + \tan\theta$ where defined.

30. If $\sec\theta = 13/5$ for acute θ , find $\tan\theta$.

31. Simplify $(\sec^2\theta - 1)/(1 - \cos^2\theta)$ where defined.

D. Extended practice - 5 marks each

32. Derive the ratios for 30° and 60° using an equilateral triangle.

33. Derive the ratios for 45° using an isosceles right triangle.

34. Prove $(1 + \tan^2\theta)/(1 + \cot^2\theta) = \tan^2\theta$ wherever defined.

35. Prove $\sin\theta/(1 + \cos\theta) = (1 - \cos\theta)/\sin\theta$ wherever defined.

ANSWER KEY - Numerical / closed questions

3) $1/2$. 4) $1/2$. 5) 1. 6) 1. 7) No. 8) 2. 9) $4/5$; $3/4$. 10) $5/13$. 11) $5/2$. 12) $5/4$. 13) 3. 14) $13/12$; $5/12$. 17) 1. 18) 2. 19) 1. 20) 30° . 21) 1. 24) $\cos 15/17$, $\tan 8/15$, $\cot 15/8$, $\sec 17/15$, $\operatorname{cosec} 17/8$. 25) $1/2$. 26) No; $\cos 90^\circ = 0$. 27) $24/25$; $7/25$. 28) $7/4$. 30) $12/5$. 31) $\sec^2\theta$.