

Higher Trigonometry Questions

1. If A is acute and $\sin A = \frac{4}{5}$, find the exact values of $\sin 2A$ and $\cos 2A$.
2. If A is obtuse and $\sin A = \frac{5}{13}$, find the exact values of $\sin 2A$ and $\cos 2A$.
3. If A and B are acute and $\sin A = \frac{1}{2}$, $\cos B = \frac{1}{3}$, find the exact value of $\cos(A-B)$.
4. If A is acute and $\cos A = \frac{8}{17}$, find the exact value of $\cos 2A$.
5. Solve the equations for $0 \leq x \leq 360$
 - a) $5\sin 2x = 7\cos x$
 - b) $5\cos 2x - 7\cos x + 6 = 0$
 - c) $4\cos 2x - 10\sin x - 7 = 0$
 - d) $4\sin 2x = 3\sin x$
 - e) $8\cos 2x - 2\cos x + 3 = 0$
 - f) $3\cos 2x + 7\sin x - 5 = 0$
 - g) $6\sin 2x = 11\sin x$
6. Solve for $0 \leq x \leq 2\pi$
 - a) $2\cos^2 x + \cos x - 1 = 0$
 - b) $2\sin^2 x + \sin x = 0$
 - c) $\cos 2x - 4\cos x = 5$
7. Find the exact value of $\sin 45^\circ + \sin 135^\circ + \sin 225^\circ$
7. Show that $\sin\left(x + \frac{\pi}{6}\right) = \frac{1}{2}(\cos x + \sqrt{3}\sin x)$
9. Show that $\sin(x+30^\circ) - \cos(x+60^\circ) = \sqrt{3}\sin x$
10. Show that $\sin(x+60^\circ) - \sin(x+120^\circ) = \sin x$

11. Prove that $\tan x - \tan y = \frac{\sin(x-y)}{\cos x \cos y}$

12. Prove that $(\sin x + \cos x)^2 = 1 + \sin 2x$

13. Prove that $\sin^3 x \cos x + \cos^3 x \sin x = \frac{1}{2} \sin 2x$

14. By writing $3x$ as $(2x + x)$ show that

a) $\sin 3x = 3\sin x - 4\sin^3 x$
 b) $\cos 3x = 4\cos^3 x - 3\cos x$

15. Using the fact that $\tan x = \frac{\sin x}{\cos x}$, show that $\frac{2 \tan x}{1 + \tan^2 x} = \sin 2x$

16. Prove that $(\cos x + \cos y)^2 + (\sin x + \sin y)^2 = 2[1 + \cos(x+y)]$

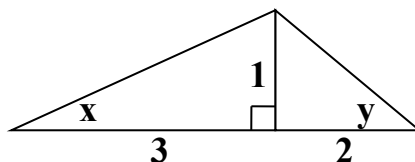
17. Work out the exact values of a) $\cos 330$ b) $\sin 210$ c) $\sin 135$

18. Simplify a) $1 - 2\sin^2 \frac{\pi}{12}$ b) $2\cos^2 \frac{\pi}{6} - 1$ c) $2\sin \frac{\pi}{8} \cos \frac{\pi}{8}$

19. If $\sin x = \frac{5}{13}$ and x is acute, find the exact values of

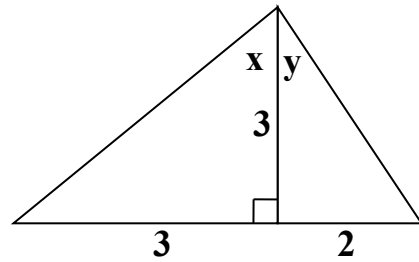
a) $\sin 2x$ b) $\cos 2x$ c) $\sin 4x$

20. Use the formula for $\sin(x+y)$ to show that $x+y = 45$.



21. Use the formula for $\cos(x+y)$ to show that

$$\cos(x+y) = \frac{1}{\sqrt{26}}$$



22. If $\sin A = \frac{1}{2}$, $\sin B = \frac{1}{3}$, and A is obtuse and B is acute, find the exact values of a) $\sin 2A$ b) $\cos(A-B)$

23. Solve the equation $\sin x \cos 33 + \cos x \sin 33 = 0.9$

24. Simplify $\cos 225 - \sin 225$

25 Solve the equations $0 \leq x \leq 360$

a) $4\sin 2x = 5\sin x$

b) $\cos 2x + 6\cos x + 5 = 0$

26. The diagram shows two right angled triangles. Find the exact value of $\sin(x+y)$.

