

TRIG EXAM 4A

NAME

Show all work on separate paper.

In 1-4, solve for x in degrees $0 \leq x \leq 360^\circ$. Give exact forms when possible.

1. $4 \sin x - 1 = 0$

2. $4 \sin^2 x - 1 = 0$

3. $2 \sin^2 x + 5 \sin x - 3 = 0$

4. $\cos^2 x + 4 \sin^2 x + 2 \cos x - 2 = 0$

In 5-9, solve for x in radians $0 \leq x \leq 2\pi$. Give exact forms when possible.

5. $\cos 2x + 3 \sin x + 1 = 0$

6. $2(\cos^2 x + \sin^2 x)^2 + 1 = 0$

7. $(1 - \tan^2 x) \tan 2x + 2 \sin x = 0$

8. $\sin 3x = -\frac{1}{2}$ (exact form).

9. $\tan^2 2x + 3 \tan 2x = 4$

In 10-13, graph $0 \leq x \leq 2\pi$

10. $y = -2 \sin x$

11. $y = \cos 3x$

12. $y = \cos\left(2x + \frac{\pi}{2}\right)$

13. $y = 4 \sin x \cos x$

Hint: Use a trig identity to simplify.

TRIG EXAM 4A solutions

1. $4\sin^2 X - 1 = 0$

$\sin^2 X = \frac{1}{4}$

$X = 14.48^\circ, 165.52^\circ$

2. $4\sin^2 X - 1 = 0$

$\sin^2 X = \frac{1}{4}$

$\sin X = \pm \frac{1}{2}$

$X = 30^\circ, 150^\circ, 210^\circ, 330^\circ$

3. $2\sin^2 X + 5\sin X - 3 = 0$

$(2\sin X - 1)(\sin X + 3) = 0$

$\sin X = \frac{1}{2}$

$X = 30^\circ, 150^\circ$

4. $\cos^2 X + 4\sin^2 X + 2\cos X - 2 = 0$

$\cos^2 X + 4(1 - \cos^2 X) + 2\cos X - 2 = 0$

$\cos^2 X + 4 - 4\cos^2 X + 2\cos X - 2 = 0$

$3\cos^2 X - 2\cos X - 2 = 0$

$\cos X = \frac{2 \pm \sqrt{4 - 4(3)(-2)}}{6}$

$= \frac{2 \pm \sqrt{28}}{6} = \frac{1 \pm \sqrt{7}}{3}$

$= 1.2152 \text{ or } -.54858$

$X = 123.27^\circ, 236.73^\circ$

5. $\cos 2X + 3\sin X + 1 = 0$

$1 - 2\sin^2 X + 3\sin X + 1 = 0$

$2\sin^2 X - 3\sin X - 2 = 0$

$(2\sin X + 1)(\sin X - 2) = 0$

$\sin X = -\frac{1}{2}, \sin X = 2$

$X = \frac{7\pi}{6}, \frac{11\pi}{6}$

6. $2(\cos X + \sin X)^2 - 1 = 0$

$2(\cos^2 X + 2\sin X \cos X + \sin^2 X) - 1 = 0$

$2(1 + \sin 2X) - 1 = 0$

$2 + 2\sin 2X - 1 = 0$

$2\sin 2X = -1$

$\sin 2X = -\frac{1}{2}$

$2X = \frac{7\pi}{6}, \frac{11\pi}{6}, \frac{2\pi + 7\pi}{6}, \frac{2\pi + 11\pi}{6}$

$X = \frac{7\pi}{12}, \frac{11\pi}{12}, \frac{19\pi}{12}, \frac{23\pi}{12}$

7. $(1 - \tan^2 X) \frac{2\tan X}{1 - \tan^2 X} + 2\sin X = 0$

$\tan^2 X \neq 1$

$2\frac{\sin X}{\cos X} + 2\sin X = 0$

$2\sin X(\sec X + 1) = 0$

$\sin X = 0, \sec X = -1$

$X = 0, \pi, 2\pi, X = \pi$

8. $\sin 3X = -\frac{1}{2}$

$3X = \frac{7\pi}{6}, \frac{11\pi}{6}, 2\pi + \frac{7\pi}{6}, 2\pi + \frac{11\pi}{6}, 4\pi + \frac{7\pi}{6}, 4\pi + \frac{11\pi}{6}$

$X = \frac{7\pi}{18}, \frac{11\pi}{18}, \frac{19\pi}{18}, \frac{23\pi}{18}, \frac{31\pi}{18}, \frac{35\pi}{18}$

9. $\tan^2 2X + 3\tan 2X - 4 = 0$

$(\tan 2X + 4)(\tan 2X - 1) = 0$

$\tan 2X = -4, \tan 2X = 1$

$2X = -1.32$

QII, QIII

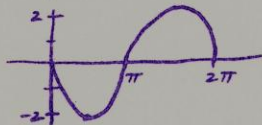
$2X = 1.82, 4.96, 8.10, 11.24$

$X = .91, 2.48, 4.05, 5.62$

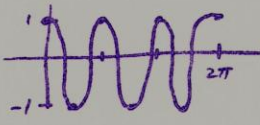
$2X = \frac{\pi}{4}, \frac{5\pi}{4}, 2\pi + \frac{\pi}{4}, 2\pi + \frac{5\pi}{4}$

$X = \frac{\pi}{8}, \frac{5\pi}{8}, \frac{9\pi}{8}, \frac{13\pi}{8}$

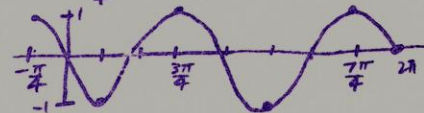
10. $y = -2\sin X$
Amp = 2



11. $y = \cos 3X$
Per = $\frac{2\pi}{3}$, Amp = 1



12. $2x + \frac{\pi}{2} = 0$
 $x = -\frac{\pi}{4}$ Left.
 $y = \cos(2x + \frac{\pi}{2})$
P.S. Per. = $\frac{2\pi}{2} = \pi$ Amp = 1.



13. $y = 4\sin X \cos X$
 $= 2\sin 2X$
Amp = 2, per = π

