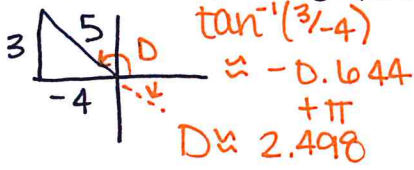


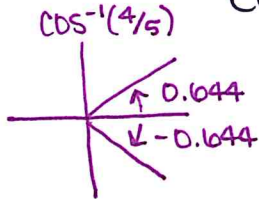
1. Solve the following equation algebraically for the given domain. Show all work.



$$-4 \cos x + 3 \sin x = 4 \quad x \in [0, 2\pi]$$

$$5 \cos(x - 2.498) = 4$$

$$\cos(x - 2.498) = 4/5$$



$$x - 2.498 \approx 0.644$$

$$x = \pi$$

$$x - 2.498 \approx -0.644$$

$$x \approx 1.855$$

2. Solve the following equation algebraically for the given domain. Show all work.

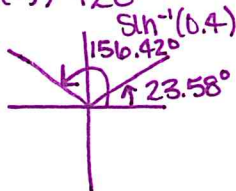
Sine difference identity $\rightarrow \sin(8\theta) \cos(5\theta) - \cos(8\theta) \sin(5\theta) = 0.4 \quad \theta \in [0, 360^\circ]$

$$\sin(8\theta - 5\theta) = 0.4$$

Period is now 1/3 of normal cycle

$$\sin(3\theta) = 0.4$$

$$\text{Period: } 360^\circ(1/3) = 120^\circ$$



$$3\theta \approx 23.58^\circ$$

$$\theta \approx 7.86^\circ + 120^\circ n$$

$$\theta \approx 127.86^\circ$$

$$\theta \approx 247.86^\circ$$

$$3\theta \approx 156.42^\circ$$

$$\theta \approx 52.14^\circ + 120^\circ n$$

$$\theta \approx 172.14^\circ$$

$$\theta \approx 292.14^\circ$$

3. Solve the following equation algebraically for the given domain. Show all work.

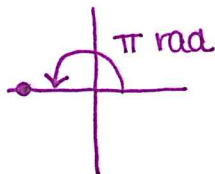
cosine difference identity $\rightarrow \cos(3x) \cos(x) + \sin(3x) \sin(x) = -1 \quad x \in [0, 2\pi]$

$$\cos(3x - x) = -1$$

Period is now 1/2 of normal cycle

$$\cos(2x) = -1$$

$$\text{Period: } 1/2(2\pi) = \pi \text{ rad.}$$



$$2x = \pi$$

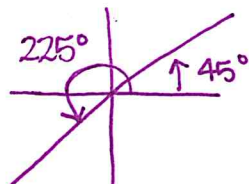
$$x = \pi/2 + \pi n$$

$$= 3\pi/2$$

4. Solve the following equation algebraically for the given domain. Show all work.

tangent sum identity $\rightarrow \frac{\tan \theta + \tan 27^\circ}{1 - \tan \theta \tan 27^\circ} = 1 \quad \theta \in [0, 360^\circ]$

$$\tan(\theta + 27^\circ) = 1$$



$$\theta + 27^\circ = 45^\circ$$

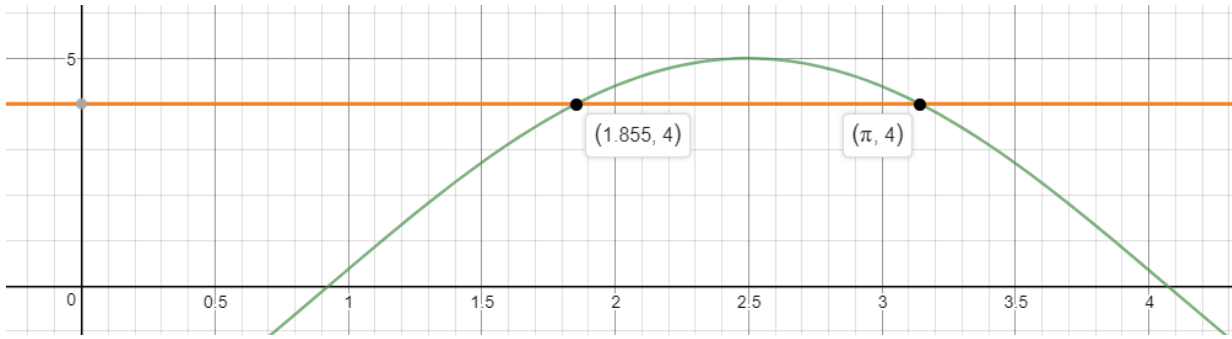
$$\theta = 18^\circ$$

$$\theta + 27^\circ = 225^\circ$$

$$\theta = 198^\circ$$

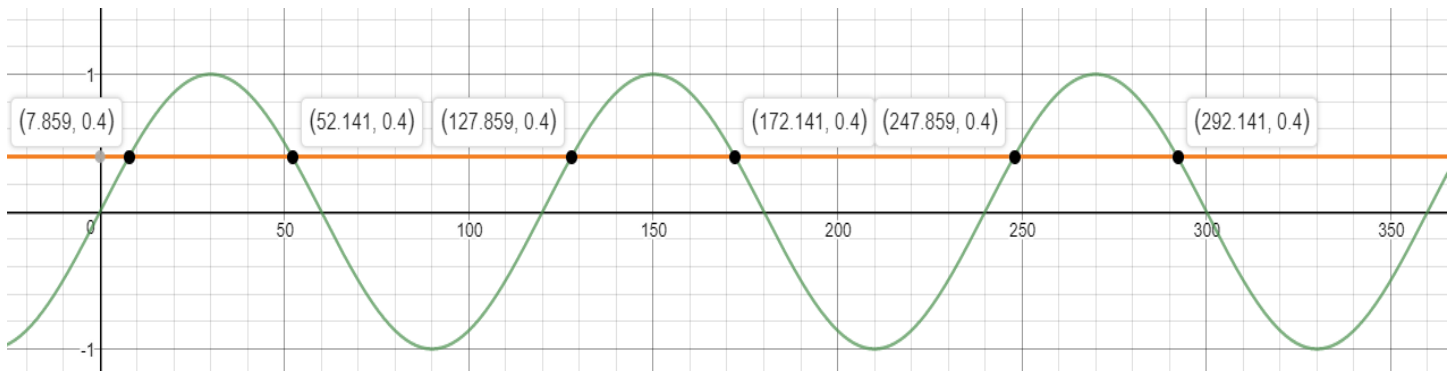
1. Solve the following equation algebraically for the given domain. Show all work.

$$-4 \cos x + 3 \sin x = 4 \quad x \in [0, 2\pi]$$



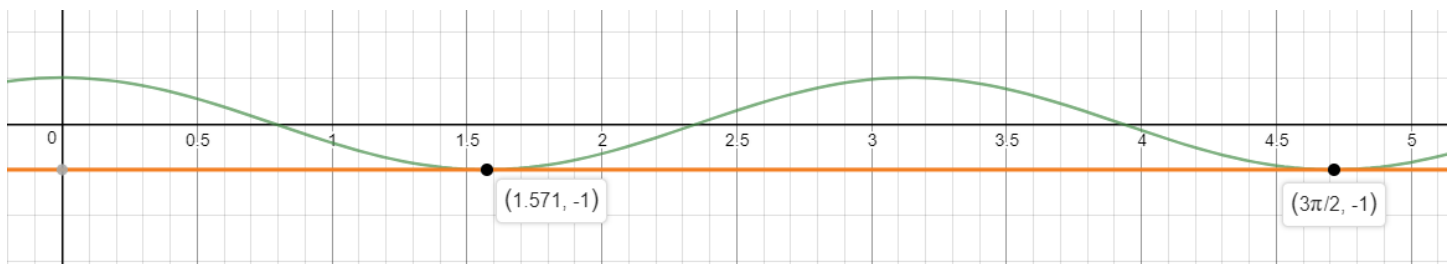
2. Solve the following equation algebraically for the given domain. Show all work.

$$\sin(8\theta) \cos(5\theta) - \cos(8\theta) \sin(5\theta) = 0.4 \quad \theta \in [0, 360^\circ]$$



3. Solve the following equation algebraically for the given domain. Show all work.

$$\cos(3x) \cos(x) + \sin(3x) \sin(x) = -1 \quad x \in [0, 2\pi]$$



4. Solve the following equation algebraically for the given domain. Show all work.

$$\frac{\tan \theta + \tan 27^\circ}{1 - \tan \theta \tan 27^\circ} \quad \theta \in [0, 360^\circ]$$

