AP Precalc

3.10 Trig Equations and Inequalities

3.10 Notes

Write your questions and thoughts here!

Solve Trigonometric Equations

RESTRICTED DOMAIN

$$0 \leq x \leq 2\pi$$

Exact Values

$2\sin x + 5 = 4$

Approximate Values

$\tan^2 x + 2\tan x - 8 = 0$

ALL VALUES

Exact Values

$4\cos^2\theta = 2$

Approximate Values

$3\sin^2\theta = \sin\theta$

Write your questions and thoughts here!

Solve Trigonometric Inequalities

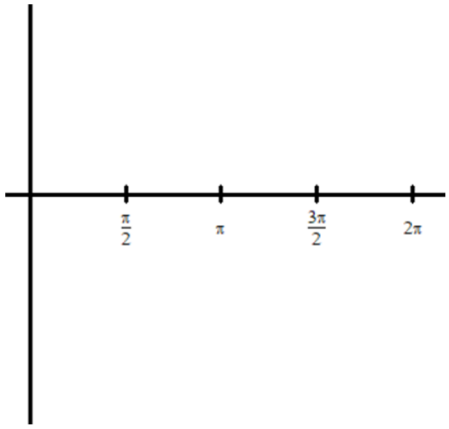
RESTRICTED DOMAIN

$$0 \leq x \leq 2\pi$$

Exact Values

$4\cos x - 1 \leq -3$

Include a rough sketch.



CHANGE IN PERIOD

ALL EXACT VALUES

$\cos(2\theta) + 4 = 4$

3.10 Trigonometric Equations and Inequalities

AP Precalculus

3.10 Practice

Solve each equation for $0 \leq x \leq 2\pi$. Find the exact value(s) using the unit circle.

1. $2\sin x + 3 = 4$

2. $4 - 3\cos x = 7$

3. $\tan^2 x = 1$

4. $-1 = \cos^2 x + 2\cos x$

Solve each equation for $0 \leq \theta \leq 2\pi$. Find the approximate value(s) using a calculator.

5. $6 = 3\cos\theta + 7$

6. $5\sin^2\theta + 3 = 6$

7. $6\cos^2\theta + 4\cos\theta = 0$

8. $\cos\theta = 3\cos^2\theta$

Solve each equation. Find ALL exact value(s) using the unit circle.

9. $2\sin^2\theta = \sin\theta$

10. $4\tan^2(2x) = 12$

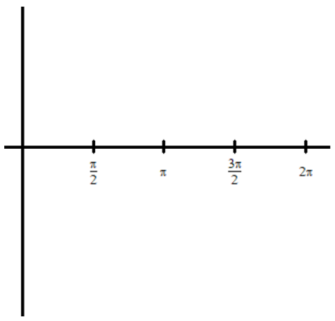
Solve each equation. Find ALL approximate value(s) using a calculator.

11. $7\sin^2 x = 5$

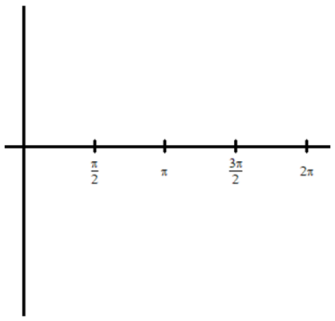
12. $5\sin\theta + 3 = 4$

Solve each inequality for $0 \le x \le 2\pi$. Find the exact value(s). Include a rough sketch.

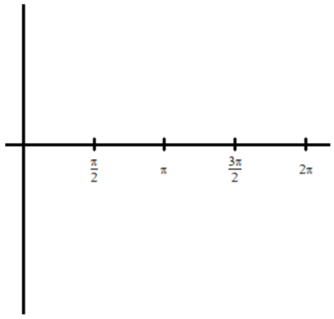
13. $2\sin x + 2 > 3$



14. $2\cos x \ge \sqrt{3}$



15. $2\cos\left(x - \frac{\pi}{2}\right) - 2 \le -3$



16. What are all values of θ, for $0 \le \theta \le 2\pi$, where $4\sin^2\theta = 2\sin\theta$?

(A) $0, \frac{\pi}{3}, \pi, \frac{2\pi}{3}, 2\pi$

(B) $0, \frac{\pi}{6}, \pi, \frac{5\pi}{6}, 2\pi$

(C) $\frac{\pi}{3}, \frac{\pi}{2}, \frac{2\pi}{3}, \frac{3\pi}{2}$

(D) $\frac{\pi}{6}, \frac{\pi}{2}, \frac{5\pi}{6}, \frac{3\pi}{2}$

17. The function f is given by $f(x) = 2\cos(3x) - 1$. For how many values of x where $0 \le x \le 2\pi$ does $f(x) = 0$?

(A) None

(B) Two

(C) Four

(D) Six

18. The function g is given by $g(x) = 2\cos(x)$. What are all solutions $g(x) = \sqrt{3}$?

(A) $x = \frac{\pi}{6} + 2\pi k$ and $\frac{5\pi}{6} + 2\pi k$, where k is any integer

(B) $x = \pm\frac{\pi}{6} + 2\pi k$, where k is any integer

(C) $x = \frac{\pi}{3} + 2\pi k$ and $\frac{2\pi}{3} + 2\pi k$, where k is any integer

(D) $x = \pm\frac{\pi}{3} + 2\pi k$, where k is any integer

19. What is the solution set for $4 < 2\sin(x) + 3$ where $0 \le x \le 2\pi$?

(A) $\left(\frac{\pi}{6}, \frac{5\pi}{6}\right)$

(B) $\left(0, \frac{\pi}{6}\right) \cup \left(\frac{5\pi}{6}, 2\pi\right)$

(C) $\left(\frac{\pi}{3}, \frac{2\pi}{3}\right)$

(D) $\left(0, \frac{\pi}{3}\right) \cup \left(\frac{2\pi}{3}, 2\pi\right)$

20. What are all values of θ, for $0 \le \theta \le 2\pi$, where $\sin^2\theta - \cos\theta\sin\theta = 0$?

(A) $\frac{\pi}{2}, \frac{3\pi}{2}, \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

(B) $0, \frac{\pi}{4}, \pi, \frac{5\pi}{4}, 2\pi$

(C) $0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}, 2\pi$

(D) $\frac{\pi}{4}$ and $\frac{5\pi}{4}$