PC 12 Session 14

February 22, 2022 3:00 PM

Pre-Calculus 12 Session 14
Thursday, February 24, 2022

1. Last Day's Homework:
   - Practice: pages 201-203, Practise 1a), c), e), g), i), k), 2a), c), e), g), i), k), 3a), c), e), 6a), c), e), 9a), c), e), 10 (all parts), 11 (all parts), 12a), c).
   - Readings: Section 5.4 pages 266 to 274.
   - Hand-in Assignments and other things: The Chapter 4 Hand-in Assignment may possibly be due on Tuesday, March 1. The Chapter 4 Test will be on Thursday, March 3.

2. More About Section 4.4: Introduction to Trigonometric Equations

3. Section 5.1: Graphing Sine and Cosine Functions

4. Section 5.2: Transformations of Sinusoidal Functions

5. Section 5.3: The Tangent Function

there is a typo in the last problem!

Homework: This depends on how far we get today.

Readings: Nothing new.

Practice from Textbook to try:

Section 4.4: pages 211-213, Practise 1a), c), 2, 3a), c), 4a), c), 5a), c), e), 6a), c), e), 7 (all), 9, 13, 16.

The Chapter 4 Review (pages 215 to 217), the Chapter 4 Practice Test (pages 218 and 219) and the Chapter 4 Review package I gave out last day.

Section 5.1: pages 233 to 237, Practise 1, 2, 3, 4a), d), 5b), d), 6, 7a), c), 8a), c), 9a), c), 10, 11a), c), 14, 18.

Section 5.2: pages 250-255, Practise 2 to 7, 10, 14, 15a), c), 16a), c).

Section 5.3: pages 262 to 265, Practise 1a), c), 2a), c), e), 3, 7, 8

Hand-in Assignments: You should be working on the Chapter 4 Hand-in Assignment. That assignment will be due next class. The Chapter 4 Test will be on Thursday, March 3.

$2\sin x + 4 = 3$

$-4 \quad -4$

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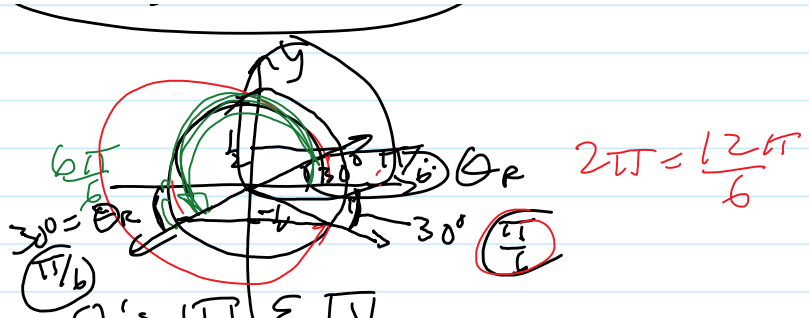
$2\sin x = -1$

solve over

$0 \leq x < 2\pi$

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

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



since is < 0 in Q's III & IV

if $\sin x = \frac{1}{2}$, then $x = \frac{\pi}{6} = \theta_R$

In QIII, $x = \frac{7\pi}{6}$

In QIV, $x = \frac{11\pi}{6}$

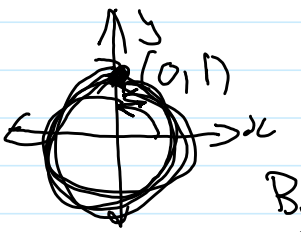
Trig equations may use θ or x to denote the angle.

General Solutions

- When we restrict the domain that we are solving an equation over, we will have a finite number of solutions (0, 1, 2, 4, ...)

- when solving a trig equation over the set of real numbers, there's an infinite number of solutions.

eg. solve $\sin\theta = 1$ over the set of real numbers (in radians)



$\theta = \frac{\pi}{2}$

But every angle that is co-terminal to $\frac{\pi}{2}$ is also a valid solution.

The general solution is $\theta = \frac{\pi}{2} + 2\pi n$, $n \in I$.

($2\pi n$: the "period" of a sine function $= 2\pi$)

For sine and cosine functions, the general (and secant and cosecant)

solutions have $+2\pi n, n \in I$ added to them,
$+360^\circ n, n \in I$

For tangent and cotangent, the general solutions have "$+\pi n, n \in I$" added to them.
$+180^\circ n, n \in I$.

Solving Second Degree Trig. Equations

These are equations that contain "$\sin^2\theta$", "$\sin^2 x$", ...

"$\cos^2\theta$" ... "$\tan^2\theta$"
$\cos^2 x$, $\tan^2 x$

$\sin^2\theta = (\sin\theta)^2 = \sin\theta \times \sin\theta$

↳ the 2 goes between the function and the variable.

For simple second degree equations, we may simply need to $\sqrt{\ }$ both sides of the equation.

$\cos^2\theta = \frac{3}{4}$

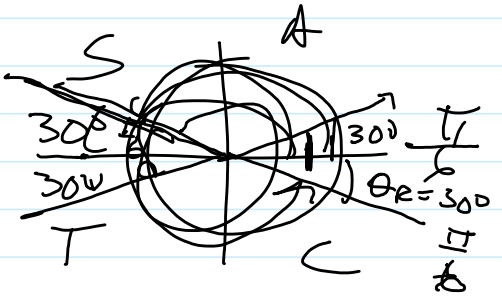
Consider BOTH the $+$ & $-$ $\sqrt{\ }$

$\sqrt{\cos^2\theta} = \pm\sqrt{3/4}$

$\cos\theta = +\sqrt{\frac{3}{4}}, -\sqrt{\frac{3}{4}}$

$\sqrt{\frac{3}{4}} = \frac{\sqrt{3}}{\sqrt{4}} = \frac{\sqrt{3}}{2}$

$\cos\theta = +\frac{\sqrt{3}}{2}$, $\cos\theta = -\frac{\sqrt{3}}{2}$
QI & QIV, QII & QIII



QI: $\theta = 30^\circ, \frac{\pi}{6}$

QIV: $\theta = 330^\circ, \frac{11\pi}{6}$

QII: $\theta = 150^\circ, \frac{5\pi}{6}$

QIII: $\theta = 210^\circ, \frac{7\pi}{6}$

} Solutions over $0^\circ \le \theta < 360^\circ$ and $0 \le \theta < 2\pi$

General solutions:

$\theta = 30° + 360°n$, $\theta = \frac{\pi}{6} + 2\pi n$

$\theta = 150° + 360°n$, $\theta = \frac{5\pi}{6} + 2\pi n$

$\theta = 210° + 360°n$, $\theta = \frac{7\pi}{6} + 2\pi n$

$\theta = 330° + 360°n$, $\theta = \frac{11\pi}{6} + 2\pi n$

$n \in I$.

For some second degree equations, we need to factor first.

Chapter 5: Graphs of Trig functions