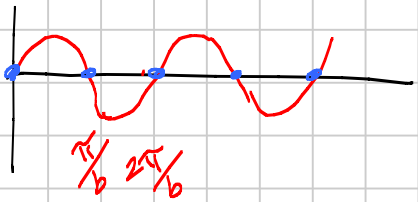
PreCalc 12 Final Review Chp 7

Note Title 2016-05-27

7.1) Solve Trig Graphically

- must use calculator on trig = polynomial
  no general solution.
- regular trig
  - 1 general solution
    - when tan θ
    - or when sin θ or cos θ equals max or min ($y=1$ $y=-1$) or centerline ($y=0$) (solution repeats π/b)



Solution has $+\pi n, n \in \mathbb{Z}$
period is still 2π

  - otherwise 2 general solutions

7.2) Solve Algebraically

- Increasing trig degree will add solutions.
- With higher degree, convert trig to polyn so that you can factor or use quadratic formula
  Important - convert factors back to trig and continue solving.
- Look for special ratios to give exact answers.

7.3) Reciprocal & Quotient Identities

Simplify - use reciprocals so that there is no denominator.
Proving - work with one side only!
- start with "LHS=" or "RHS=" then end with "=RHS" or "=LHS"
- don't skip steps, and recall algebra.

- Solve equations, prove identities.
- Use common denominator when combining terms.
- Multiply by the reciprocal if fractional denominator

eg) $\text{den} = 1 - \frac{1}{x}$ can't reciprocate

$\frac{x-1}{x}$ can reciprocate.

- When you see $\frac{\sin\theta}{\cos\theta}$ or $\frac{\cos\theta}{\sin\theta}$ replace with $\tan\theta$ or $\cot\theta$. eg) $\sin x = -4\cos x$

$\sin x/\cos x = -4$

$\tan x = -4$. - - -

7.4) Pythagorean Identities

- copy from notes
- convert all to $\sin\theta$ & $\cos\theta$ when stuck.
- multiply by conjugates when you see them in the denominator b/c things will cancel.
- use ident to convert eqn into $\sin\theta$ or $\cos\theta$ with higher degree (2) trig, then factor.

eg) $\sin\theta = \cos^2\theta + 1/2$

$\sin\theta = (1-\sin^2\theta) + 1/2$

$\sin^2\theta + \sin\theta - 1/2 = 0$ now factor Q.F.

7.5) Sum & Difference Ident.

- copy from notes
- for exact ratios use sum/diff of 2 special angles that are non-axes: ie) $30°, 45°, 60°$

not $0°, 90°, 180°, 270°$

eg) $255° = 180°+75°$ doesn't help.

$= 210°+45°$ it helps.

$195° = 240°-45°$

- don't put ratio back into trig fns. with ident.

eg) $\sin(23\pi/12) = \sin\frac{7\pi}{4}\cos\frac{\pi}{6} + \cos\frac{7\pi}{4}\sin\frac{\pi}{6}$

$\sin\frac{7\pi}{4} = -1/\sqrt{2}$, $\cos\frac{\pi}{6} = \sqrt{3}/2$, $\cos\frac{7\pi}{4} = 1/\sqrt{2}$, $\sin\frac{\pi}{6} = 1/2$

wrong! $= \sin(-1/\sqrt{2})\cos(\sqrt{3}/2) + \cos(1/\sqrt{2})\sin(1/2)$

$= -1/\sqrt{2}(\sqrt{3}/2) + 1/\sqrt{2}(1/2)$

7.6) Double Angle Ident.

- copy from notes
- use ident to get rid of double angles, then solve/prove.
- use ident to get exact answers
- take time to replace $\cos 2\theta$ appropriately

Final Cautions: Never: $\sin\theta + \cos\theta = \ldots$

$\sin^2\theta$ vs $\sin 2\theta$

never: $\sin 2\theta$ (halfway.)