Midterm 3 review guide. Math 30 (Precalculus).
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This is a list of topics that you should know well from each section, and which exercises from the book you can do practice that topic.

NOTE: The list of exercises is very long. It does not mean that you have to do all these exercises. Rather, for each topic in each section, try a couple of exercises. If everything is very clear, move on to the next topic; otherwise try a few more exercises and ask for help if you need.

- **Section 5.1**

  - Understand the concept of angle, initial side, terminal side.
  - Be able to draw angles in standard position, both when given in degrees and when given in radians. *Ex. 6–31.*
  - Know the values of the special angles, in degrees and in radians.
  - Be able to convert between degrees and radians. *Ex. 26–39.*
  - Finding coterminal angles, both in degrees and in radians. *Ex. 40–53, 54–57.*
  - Finding length of arcs and area of sectors. *Ex. 24, 25, 41, 43.*

- **Section 5.2**

  - Understand the definition of sine and cosine of any angle: the unit circle. *Ex. 6–9, 60–79.*
  - Knowing the Pythagorean identity: $\sin^2 \alpha + \cos^2 \alpha = 1$.
  - Knowing the sine and the cosine of the special angles, both when given in degrees and when given in radians. *Ex. 10–22.*
  - Finding reference angles, both in degrees and in radians. *Ex. 23–33.*
  - Use reference angles to find the value of sine and cosine of any angle. *Ex. 34–49.*
  - Given the value of the sine or the cosine of an angle, and the quadrant, be able to find the other one. *Ex. 50–53.*

- **Section 5.3**

  - Understand and remember the definitions of tangent, secant, cotangent and cosecant. *Ex. 49–51.*
  - Finding the value of all the trigonometric functions of the special angles. *Ex. 6–31.*
  - Given the value of one of the trigonometric functions, and the quadrant, be able to find the value of all the other ones. *Ex. 38–41.*

- **Section 5.4**

  - Given a right triangle, understand the definition of the trigonometric functions of the acute angles of the triangle as quotients of the sides of the triangle (for example $\sin \alpha = $ opposite/hypotenuse. *Ex. 17–22, 23–28.*
  - Use trigonometry to find the length of one side of a right triangle if one acute angle and the length of another side is given. *Ex. 10–16, 17–22, 29–31.*

- **Section 6.1**

  - Understand the concept of periodic function. Know that $\sin x$, $\cos x$, $\sec x$, and $\csc x$ are periodic with period 2π, and $\tan x$ and $\cot x$ is periodic with period π. *Ex. 1, 2.*
  - Be able to graph $\sin x$ and $\cos x$, appropriately labeling the axes.
  - Find the period, amplitude, and phase shift of a sinusoidal function. *Ex. 18–26.*
  - Be able to graph sinusoidal functions, appropriately labeling the axes. *Ex. 6–17.*

- **Section 6.3**

  - Understand the definition of $\sin^{-1} x$, $\cos^{-1} x$ and $\tan^{-1} x$.
  - Be able to find $\sin^{-1} x$, $\cos^{-1} x$ and $\tan^{-1} x$ of some numbers without a calculator, and of any number with a calculator. *Ex. 8–21, 22, 23.*

- **Section 7.1**

  - Understand what is a trigonometric identity. Know the fundamental trigonometric identities (see "summarizing trigonometric identities" in the textbook. *Ex. 5, 7, 13, 15, 17, 19, 21.*
  - Understand what it means to "verify", or "prove" a trigonometric identity.
  - Be able to prove basic trigonometric identities. *Use the Trigonometric Identities Worksheet in the course webpage:* `https://fsw01.bcc.cuny.edu/luis.fernandez01/web/teaching/classes/math30/hw/trigidentities.pdf`

- **Section 7.5**

  - Solve simple trigonometric equations when the variable lies in an interval. *Ex. 4–12.*
  - Use algebra to solve trigonometric equations. *Ex. 13–22*
  - Solve trigonometric equations involving several trigonometric functions. *Ex. 23–26.*