

Ch. 3 & 4 Review

Note: This is not a complete list of topics – you should study your lecture notes and homework in addition to reviewing the items listed here.

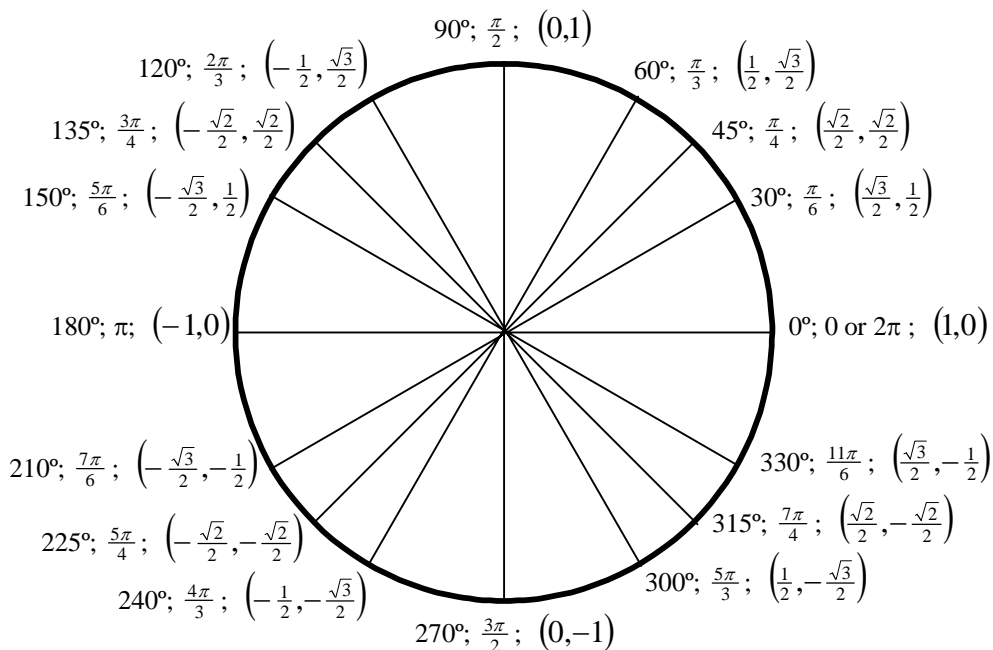
1. radians

- a. given degrees, $x^\circ = x^\circ \cdot \frac{\pi}{180^\circ} \text{ rad}$
- b. given radians, $x = x \cdot \frac{180^\circ}{\pi}$

2. applications of radians (all angles must be in radians)

- a. arc length: $s = r \cdot \theta$
- b. area of a sector: $A = \frac{1}{2} r^2 \theta$
- c. angular velocity: $\omega = \frac{\theta}{t}$
- d. linear velocity: $v = \frac{s}{t} = r\omega$

3. unit circle



4. graphs of the sine and cosine functions

- a. $y = c + a \cos[b(x - d)]$ and $y = c + a \sin[b(x - d)]$
 - i. amplitude = a
 - ii. period = $\frac{2\pi}{b}$
 - iii. vertical shift = c
 - iv. horizontal shift = d

5. graphs of the other trigonometric functions

- a. $y = c + a \csc[b(x - d)] \Rightarrow$ use $y = c + a \sin[b(x - d)]$ as a 'guide'
- b. $y = c + a \sec[b(x - d)] \Rightarrow$ use $y = c + a \cos[b(x - d)]$ as a 'guide'
- c. $y = c + a \tan[b(x - d)]$
 - i. no amplitude, but a stretches the graph vertically
 - ii. period = $\frac{\pi}{b}$
 - iii. c and d act as vertical and horizontal shifts, respectively
 - iv. one period: $-\frac{\pi}{2} < b(x - d) < \frac{\pi}{2}$
 - v. vertical asymptotes
- d. $y = c + a \cot[b(x - d)]$
 - i. no amplitude, but a stretches the graph vertically
 - ii. period = $\frac{\pi}{b}$
 - iii. c and d act as vertical and horizontal shifts, respectively
 - iv. one period: $0 < b(x - d) < \pi$
 - v. vertical asymptotes