Trig. Ratios on the Unit Circle
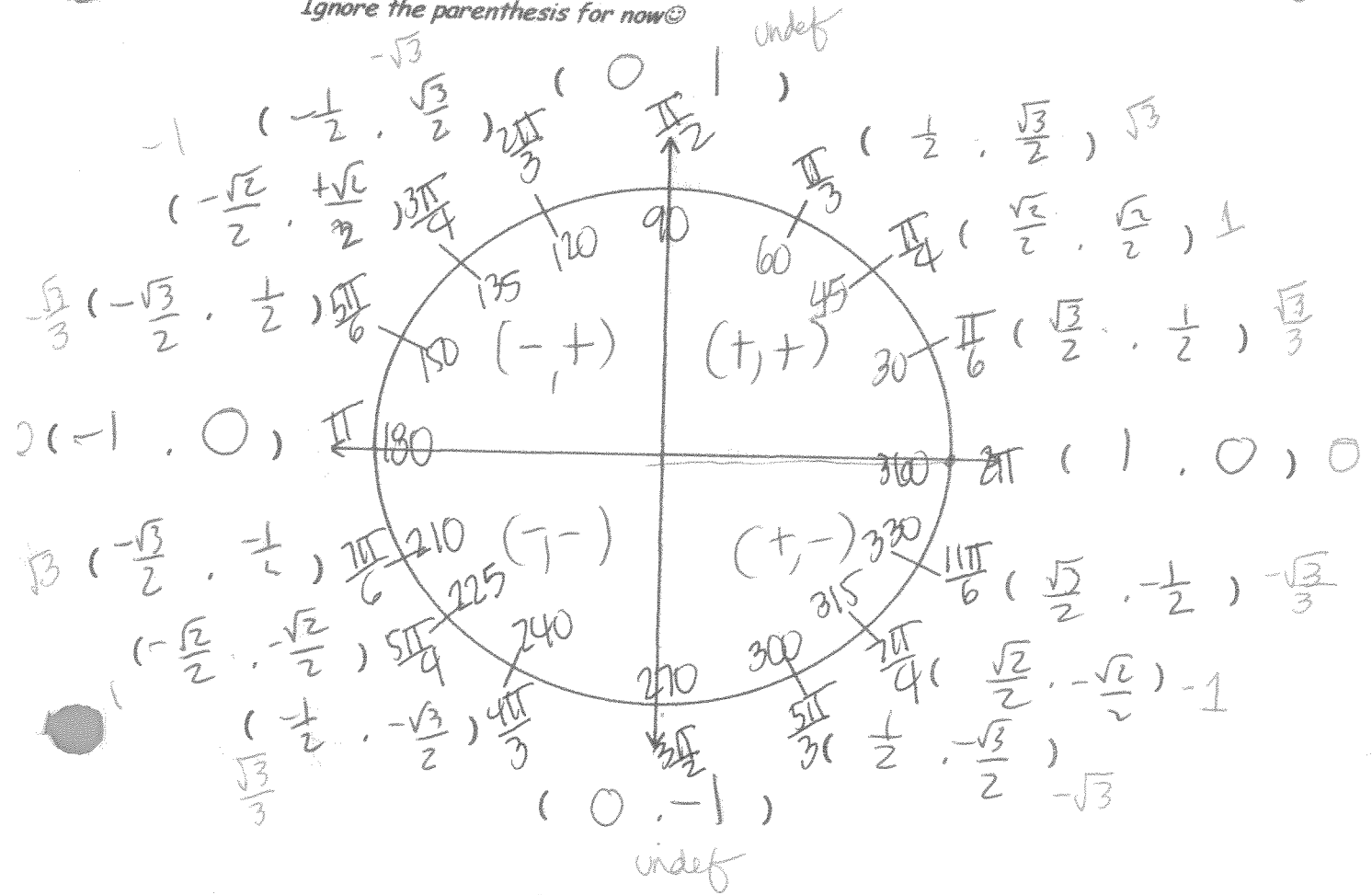
tangent

Fill in the angles on the unit circle in both degrees and radians.
Ignore the parenthesis for now☺

Unit circle labels:

- undef
- $(0, 1)$ — $\frac{\pi}{2}$ — 90
- $-\sqrt{3}$ — $(-\frac{1}{2}, \frac{\sqrt{3}}{2})$ — $\frac{2\pi}{3}$ — 120
- $(\frac{1}{2}, \frac{\sqrt{3}}{2})$ — $\sqrt{3}$ — $\frac{\pi}{3}$ — 60
- -1 — $(-\frac{\sqrt{2}}{2}, +\frac{\sqrt{2}}{2})$ — $\frac{3\pi}{4}$ — 135
- $(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$ — 1 — $\frac{\pi}{4}$ — 45
- $\frac{\sqrt{3}}{3}$ — $(-\sqrt{3}, \frac{1}{2})$ — $\frac{5\pi}{6}$ — 150
- $(\frac{\sqrt{3}}{2}, \frac{1}{2})$ — $\frac{\sqrt{3}}{3}$ — $\frac{\pi}{6}$ — 30
- $(-, +)$
- $(+, +)$
- $0(-1, 0)$ — π — 180
- $(1, 0)$ — 0 — 2π — 360
- $\sqrt{3}(-\frac{\sqrt{3}}{2}, -\frac{1}{2})$ — $\frac{7\pi}{6}$ — 210
- $(-, -)$
- $(+, -)$ 330 — $\frac{11\pi}{6}(\frac{\sqrt{3}}{2}, -\frac{1}{2})$ — $-\frac{\sqrt{3}}{3}$
- 225
- 315 — $\frac{7\pi}{4}(\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2})$ — -1
- $(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2})$ — $\frac{5\pi}{4}$
- 240 — 300
- $(-\frac{1}{2}, -\frac{\sqrt{3}}{2})$ — $\frac{4\pi}{3}$
- $\frac{5\pi}{3}(\frac{1}{2}, -\frac{\sqrt{3}}{2})$
- $-\sqrt{3}$
- $\frac{\sqrt{3}}{3}$
- 270
- $(0, -1)$ — $\frac{3\pi}{2}$
- undef

B) Use the unit circle, x, and y to find the trigonometric ratios for each.

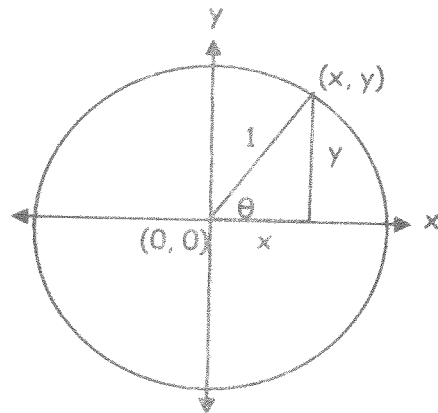1. $\cos\theta = \dfrac{x}{1} = x$

2. $\sin\theta = \dfrac{y}{1} = y$

3. $\tan\theta = \dfrac{y}{x} = \dfrac{\sin\theta}{\cos\theta}$

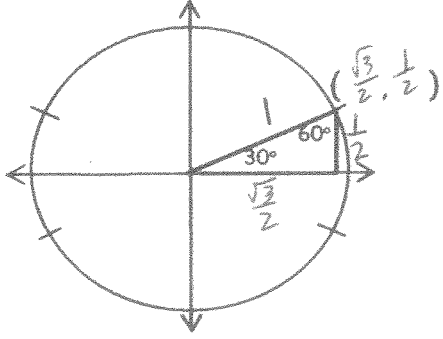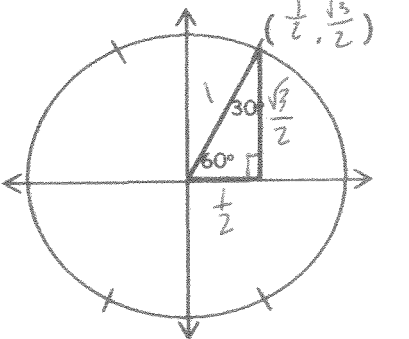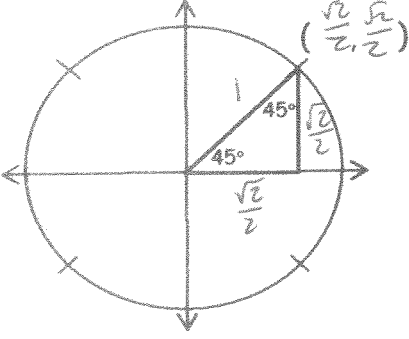4. $\sec\theta = \dfrac{1}{x} \quad \dfrac{1}{\cos\theta}$

5. $\csc\theta = \dfrac{1}{y} \quad \dfrac{1}{\sin\theta}$

6. $\cot\theta = \dfrac{x}{y} = \dfrac{\cos\theta}{\sin\theta}$

C) Use the special right triangles to find the trigonometric ratios of each angle.

Remember: The unit circle has a radius of 1

Focus on 30° Reference Angle:	Focus on 60° Reference Angle:	Focus on 45° Reference Angle:
1. $\sin 30 = \dfrac{1}{2}$ (x, y) $(\cos, \sin)$	1. $\sin 60 = \dfrac{\sqrt{3}}{2}$	1. $\sin 45 = \dfrac{\sqrt{2}}{2}$
2. $\cos 30 = \dfrac{\sqrt{3}}{2}$	2. $\cos 60 = \dfrac{1}{2}$	2. $\cos 45 = \dfrac{\sqrt{2}}{2}$
3. $\tan 30 = \dfrac{\frac{1}{2}}{\frac{\sqrt{3}}{2}} = \dfrac{1}{\sqrt{3}} = \dfrac{\sqrt{3}}{3}$	3. $\tan 60 = \sqrt{3}$	3. $\tan 45 = \dfrac{\frac{\sqrt{2}}{4}}{\frac{\sqrt{2}}{2}} = 1$
4. $\sec 30 = \dfrac{2}{\sqrt{3}}$ $\dfrac{2\sqrt{3}}{3}$	4. $\sec 60 = 2$	4. $\sec 45 = \dfrac{2}{\sqrt{2}} = \dfrac{2\sqrt{2}}{2} = \sqrt{2}$
5. $\csc 30 = 2$	5. $\csc 60 = \dfrac{2}{\sqrt{3}} = \dfrac{2\sqrt{3}}{3}$	5. $\csc 45 = \sqrt{2}$
6. $\cot 30 = \sqrt{3}$	6. $\cot 60 = \dfrac{1}{\sqrt{3}} = \dfrac{\sqrt{3}}{3}$	6. $\cot 45 = 1$

D) Now go back to the circle on the front and fill in the parenthesis with the coordinates found in the table above.

E) You must memorize this unit circle completely in order to prepare for what is coming in the classes ahead! Practice drawing one and filling in all the parts!