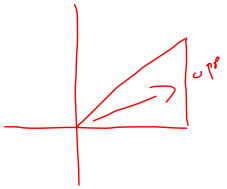
#5 pg 200

$\csc x = \frac{5}{4}$ $\quad 0 \le x \le 90$



$\sin x = \frac{4}{5}$

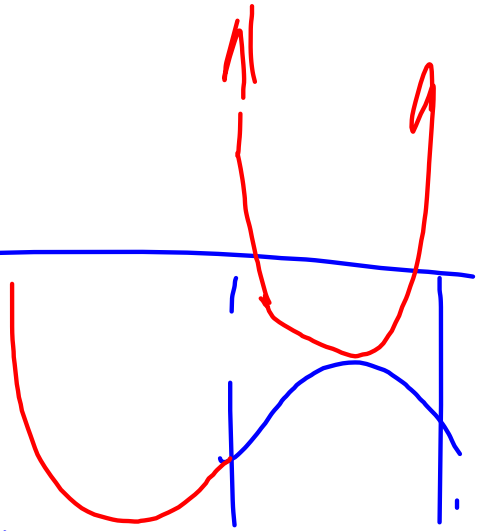
$x = 3$
$y = 4$
$r = 5$

$\cos x = \frac{3}{5}$

then $\sec x = \frac{5}{3}$

$\tan x = \frac{4}{3}$

So $\cot x = \frac{3}{4}$



#7

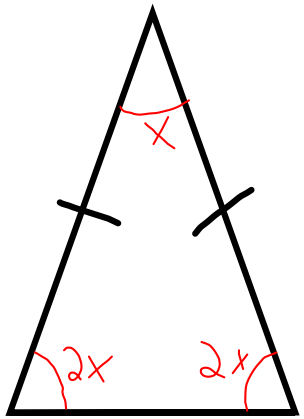
$\csc x = 1.25$

$\sin x = \frac{1}{1.25}$

$x = \sin^{-1}\left(\frac{1}{1.25}\right)$

$\doteq 53.1$

#11 pg 208



Let the measure of the third angle be x radians.

$$2x + 2x + x = \pi$$

$$5x = \pi$$

$$x = \frac{\pi}{5}$$

$$2x = \frac{2\pi}{5}$$

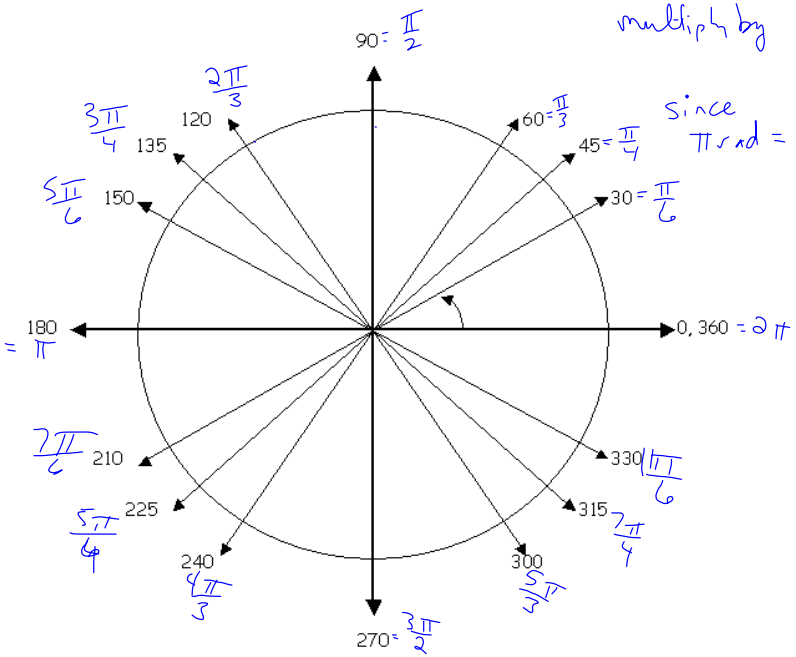
So the angle measures are $\frac{\pi}{5}, \frac{2\pi}{5}$ & $\frac{2\pi}{5}$.

Radian Wheel: Radian Angles in Standard Position

- Beside each angle stated in degrees, give the equivalent value in radians (no decimals).
- Look for patterns in your radians values. These patterns can help you to easily convert between degrees and radians.
- For the radian values with the same denominators, highlight the angles' terminal arms in the same colour.

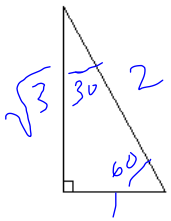
Degrees → Radians
multiply by $\frac{\pi}{180^\circ}$

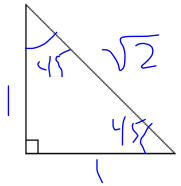
since π rad = 180°

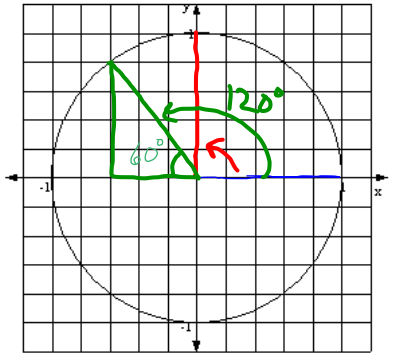


Lesson #4.2: Trigonometric Ratios and Special Angles

Use the triangles and the unit circle to complete the table on the next page







$\sin 30^\circ = \frac{1}{2}$

$\cos 30^\circ = \frac{\sqrt{3}}{2}$

$\tan 30^\circ = \frac{1}{\sqrt{3}}$

Summary of Special Angles and Trigonometric Ratios

Special Angles and Trigonometric Ratios				
$\theta(^\circ)$	θ(radians)	$\sin\theta$	$\cos\theta$	$\tan\theta$
0	0	0	1	0
30	$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{3}}$
45	$\frac{\pi}{4}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{\sqrt{2}}$	1
60	$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$
90	$\frac{\pi}{2}$	1	0	Undefined
120	$\frac{2\pi}{3}$	$\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	$-\sqrt{3}$
135	$\frac{3\pi}{4}$	$\frac{1}{\sqrt{2}}$	$-\frac{1}{\sqrt{2}}$	-1
150	$\frac{5\pi}{6}$	$\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$-\frac{1}{\sqrt{3}}$
180	π	0	-1	0
210	$\frac{7\pi}{6}$	$-\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{3}}$
225	$\frac{5\pi}{4}$	$-\frac{1}{\sqrt{2}}$	$-\frac{1}{\sqrt{2}}$	1
240	$\frac{4\pi}{3}$	$-\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	$\sqrt{3}$
270	$\frac{3\pi}{2}$	-1	0	Undefined
300	$\frac{5\pi}{3}$	$-\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$-\sqrt{3}$
315	$\frac{7\pi}{4}$	$-\frac{1}{\sqrt{2}}$	$\frac{1}{\sqrt{2}}$	-1
330	$\frac{11\pi}{6}$	$-\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$-\frac{1}{\sqrt{3}}$
360	2π	0	1	0

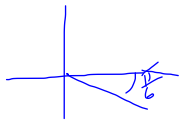
Name: _____ Date: _____

Summary of Special Angles and Trigonometric Ratios

Special Angles and Trigonometric Ratios				
θ(°)	θ(radians)	sin θ	cos θ	tan θ
0				
30				
45				
60				
90				
120				
135				
150				
180				
210				
225				
240				
270				
300				
315				
330				
360				

measure of angle (in radians) = length of arc / radius

3. Use the unit circle to determine exact values for the ~~six~~ trigonometric ratios for $\frac{11\pi}{6}$.



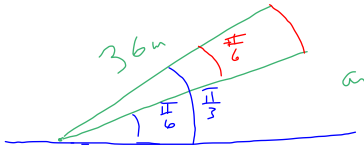
$\sin\frac{11\pi}{6} = -\sin\frac{\pi}{6} = -\frac{1}{2}$ $\quad \cos\frac{11\pi}{6} = \frac{\sqrt{3}}{2}$ $\quad \tan\frac{11\pi}{6} = -\frac{1}{\sqrt{3}}$

$\csc\frac{11\pi}{6} = -2$ $\quad \sec\frac{11\pi}{6} = \frac{2}{\sqrt{3}}$ $\quad \cot\frac{11\pi}{6} = -\sqrt{3}$

4. Julia is flying a kite at the end of a 36 m string. The string makes an angle of $\frac{\pi}{3}$ rad with the ground. The wind decreases and the kite flies lower until the string makes an angle of $\frac{\pi}{6}$ rad with the ground.

a) Determine an exact expression for the ~~horizontal~~ actual distance that the kite moves between the two positions.

b) Determine an approximate answer, to the nearest tenth of a metre, for the vertical distance that the kite moves between the two positions.



$r = 36$ m

angle $= \frac{\pi}{6}$

SEE NEXT pg.

So $\frac{\pi}{6} = \frac{\text{length of arc}}{36}$

$6\pi = \text{length of arc}$

So the length of the arc is exactly 6π m.

5. **a)** Determine an exact value for each expression.

i) $\sin\frac{\pi}{3}\tan\frac{\pi}{4} - \cos\frac{\pi}{3}\tan\frac{\pi}{6}$

$= \frac{\sqrt{3}}{2}(1) - \frac{1}{2}\left(\frac{1}{\sqrt{3}}\right)$

$= \frac{\sqrt{3}}{2\sqrt{3}} - \frac{1}{2\sqrt{3}}$ $\quad \frac{\sqrt{3}}{\sqrt{3}}$

$= \frac{2}{2\sqrt{3}} - \frac{1}{2\sqrt{3}}$

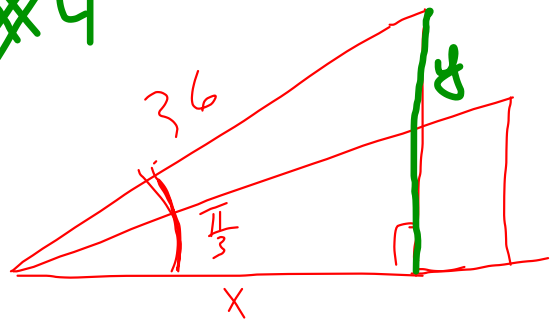
$= \frac{1}{\sqrt{3}}$

ii) $\dfrac{\tan\frac{7\pi}{3} - \tan\frac{5\pi}{3}}{1 + \tan\frac{7\pi}{3}\tan\frac{5\pi}{3}}$

b) Use a calculator to check your answers to part a).

Homework: pg 216; #8 – 14, 16 – 18
Handin: pg 219; #20

#4



$$\cos\frac{\pi}{3} = \frac{x}{36}$$

$$\sin\frac{\pi}{3} = \frac{y}{36}$$