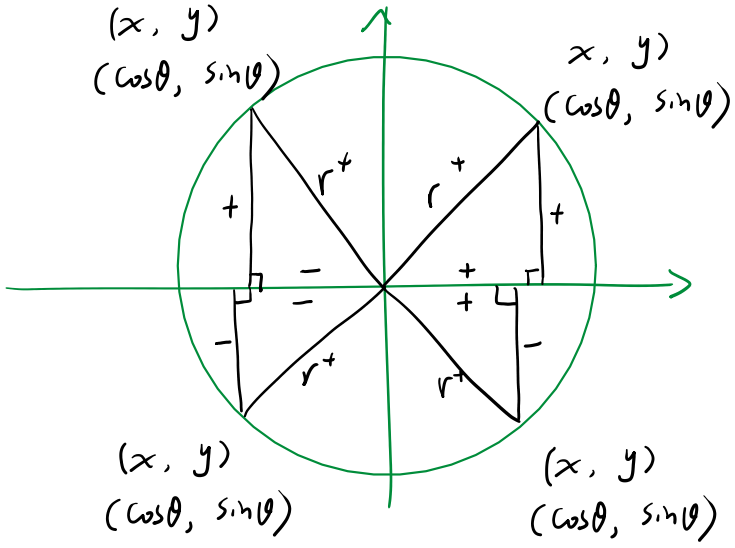
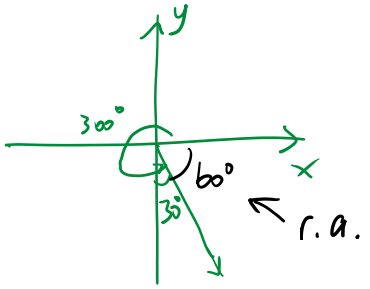
VIII. Cont.



eg. Find the exact value of $\cos 300°$.

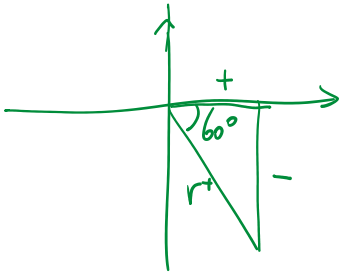
← last example from Monday

Sol:



300° connects with 270° or 360°

$90° - 30° = 60$



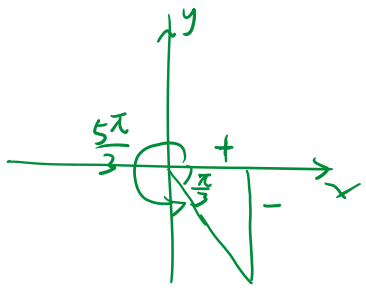
$\cos 300° = \cos 60°$ in r.a.

$= \boxed{\frac{1}{2}}$

eg Find exact of $\sin A$ and $\cos A$ for $A = \frac{5\pi}{}$

eg. Find each of $\sin\theta$ and $\cos\theta$ for $\theta = \frac{5\pi}{3}$.

Sol:



$\frac{5\pi}{3}$ connects to $\pi\left(\frac{3\pi}{3}\right)$

$\frac{6\pi}{3} - \frac{5\pi}{3} = \frac{\pi}{3}$

2π

60°

$\sin\frac{5\pi}{3} = \sin\frac{\pi}{3}$ in r.a. ← $\frac{\pi}{3} = 60°$ in your head

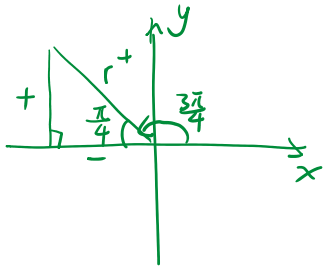
$= \boxed{-\frac{\sqrt{3}}{2}}$

$\cos\frac{5\pi}{3} = \cos\frac{\pi}{3}$ in r.a.

$= \boxed{\frac{1}{2}}$

eg. Find each of $\sin\theta$ and $\cos\theta$ for $\theta = \frac{3\pi}{4}$.

Sol:



$\frac{3\pi}{4}$ connects to π or $\frac{\pi}{2}$

$\pi - \frac{3\pi}{4} = \frac{4\pi}{4} - \frac{3\pi}{4} = \frac{\pi}{4}$

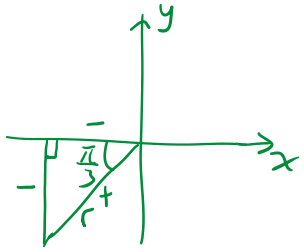
45°

$\sin\frac{\pi}{4} = \boxed{\frac{\sqrt{2}}{2}}$

$\cos\frac{\pi}{4} = \boxed{-\frac{\sqrt{2}}{2}}$

eg. Find each of $\sin\theta$ and $\cos\theta$ for $\theta = \frac{22\pi}{3}$.

Sol:



$\frac{22\pi}{3}$ reduces $2\pi = \frac{6\pi}{3}$

$2\pi \cdot \frac{3}{3} = \frac{6\pi}{3}$

$\frac{22\pi}{3} - \frac{6\pi}{3} - \frac{6\pi}{3} - \frac{6\pi}{3} = \frac{4\pi}{3}$

$\frac{4\pi}{3} = \frac{3\pi}{3} + \frac{\pi}{3}$

$60°$

$\sin\frac{22\pi}{3} = \sin\frac{\pi}{3}$ in r.a.

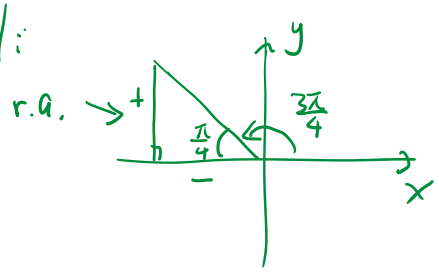
$= \boxed{-\frac{\sqrt{3}}{2}}$

$\cos\frac{22\pi}{3} = \cos\frac{\pi}{3}$ in r.a.

$= \boxed{-\frac{1}{2}}$

eg. Evaluate $\tan\frac{27\pi}{4}$.

Sol:



2π

$\frac{27\pi}{4}$ connects to $\frac{8\pi}{4}$

$\frac{27\pi}{4} = \frac{27\pi}{4} - \frac{8\pi}{4} - \frac{8\pi}{4} - \frac{8\pi}{4} = \frac{3\pi}{4}$

$\frac{\pi}{4}$ away from π

$\tan\frac{27\pi}{4} = \tan\frac{\pi}{4}$ in r.a.

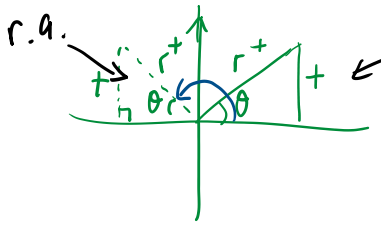
$= \boxed{-1}$

eg. Find the angle θ that $\sin\theta = \frac{\sqrt{2}}{2}$, in $[0, 360°]$

Sol:

$\theta = 45°$ ← not done

r.a. r.a.



$\theta = 45°$

$\theta = 45°,\ 180° - 45°$

$= \boxed{45°},\ \boxed{135°}$

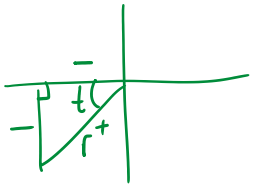
r.a.

exact soluⁿ (non-decimal)

$\frac{\sqrt{3}}{2}$ ✓ ~~0.7~~

eg. If $\cos(t) = -\frac{1}{2}$ and t is in the third quadrant, find $\sin(t)$.

sol: in the third quadrant ← big hint



$\cos(t) = -\frac{1}{2}$ in r.a.

$t = 60°$

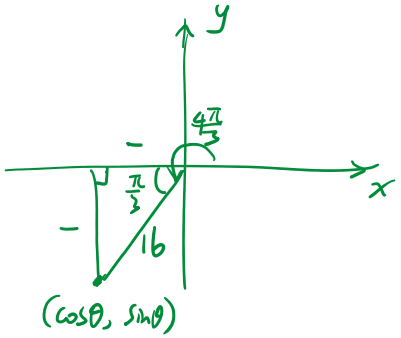
$\sin 60° = \boxed{-\frac{\sqrt{3}}{2}}$

$\cos ? = \frac{1}{2}$

$60°$

eg. Find the coordinates of the point on a circle with radius 16 corresponding to an angle of $\frac{4\pi}{3}$.

sol:



$\frac{4\pi}{3} = \frac{4\pi}{3} - \frac{3\pi}{3} = \frac{\pi}{3}$

$60°$

$\cos\frac{\pi}{3} = \frac{-x}{16}$, $\quad \sin\frac{\pi}{3} = \frac{-y}{16}$

$\frac{1}{2} = \frac{-x}{16}$ $\quad \frac{\sqrt{3}}{2} = \frac{-y}{16}$

$8 = -x$ $\quad \frac{\sqrt{3}}{2} \cdot 16^{8} = -y$

$-8 = x$ $\quad -8\sqrt{3} = y$

$\boxed{(-8, -8\sqrt{3})}$