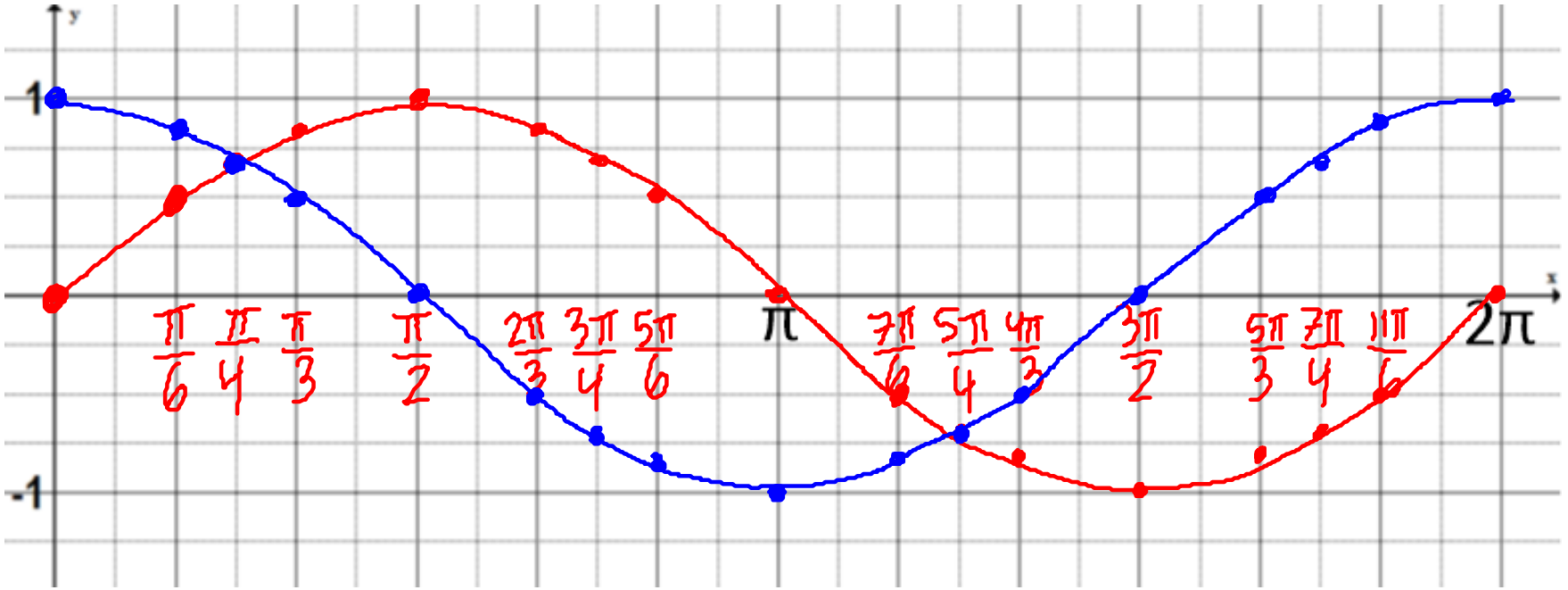
Graphing $\sin\theta$, $\cos\theta$ and $\tan\theta$

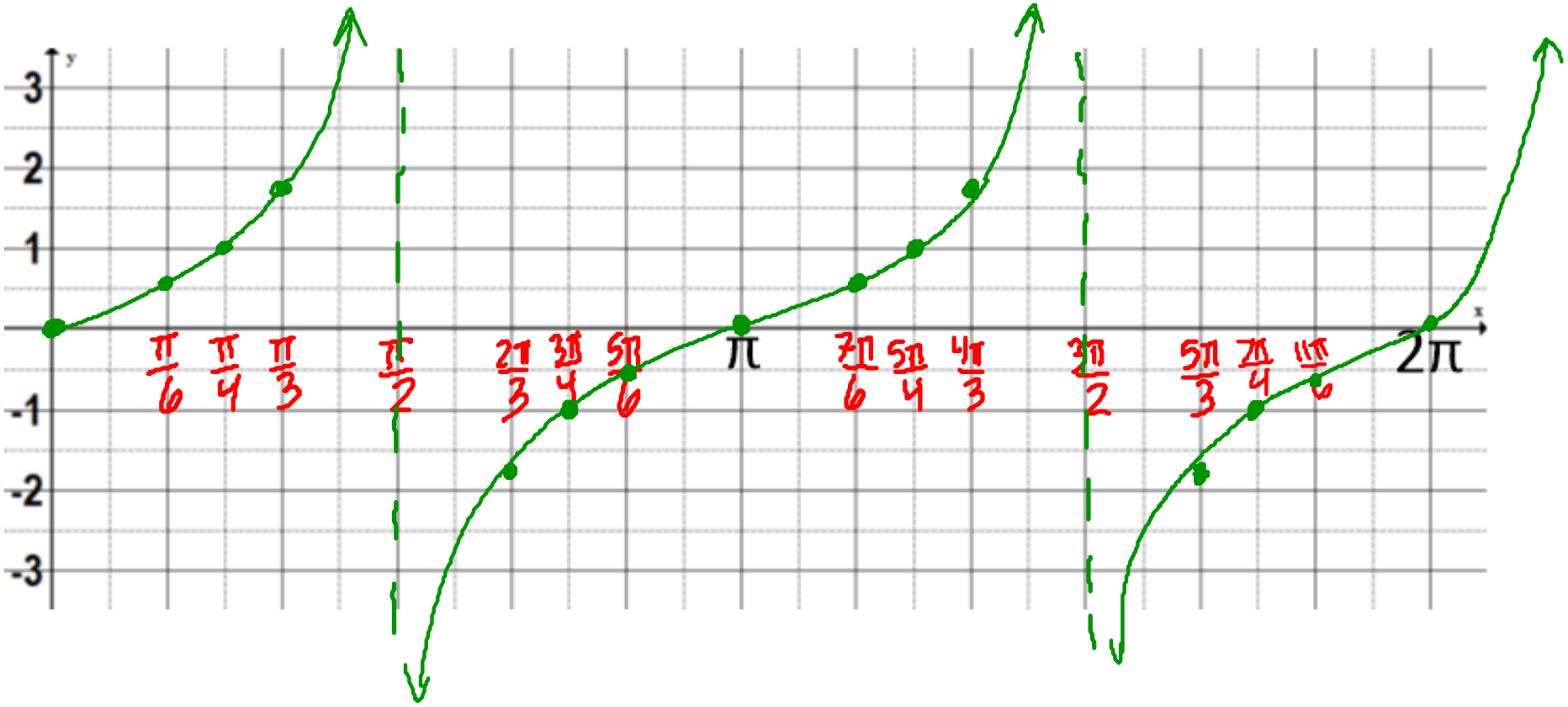
θ	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	π
$\sin\theta$	0	0.5	0.707	0.866	1	0.866	0.707	0.5	0
$\cos\theta$	1	0.866	0.707	0.5	0	-0.5	-0.707	-0.866	-1

θ	$\frac{7\pi}{6}$	$\frac{5\pi}{4}$	$\frac{4\pi}{3}$	$\frac{3\pi}{2}$	$\frac{5\pi}{3}$	$\frac{7\pi}{4}$	$\frac{11\pi}{6}$	2π
$\sin\theta$	-0.5	-0.707	-0.866	-1	-0.866	-0.707	-0.5	0
$\cos\theta$	-0.866	-0.707	-0.5	0	0.5	0.707	0.866	1



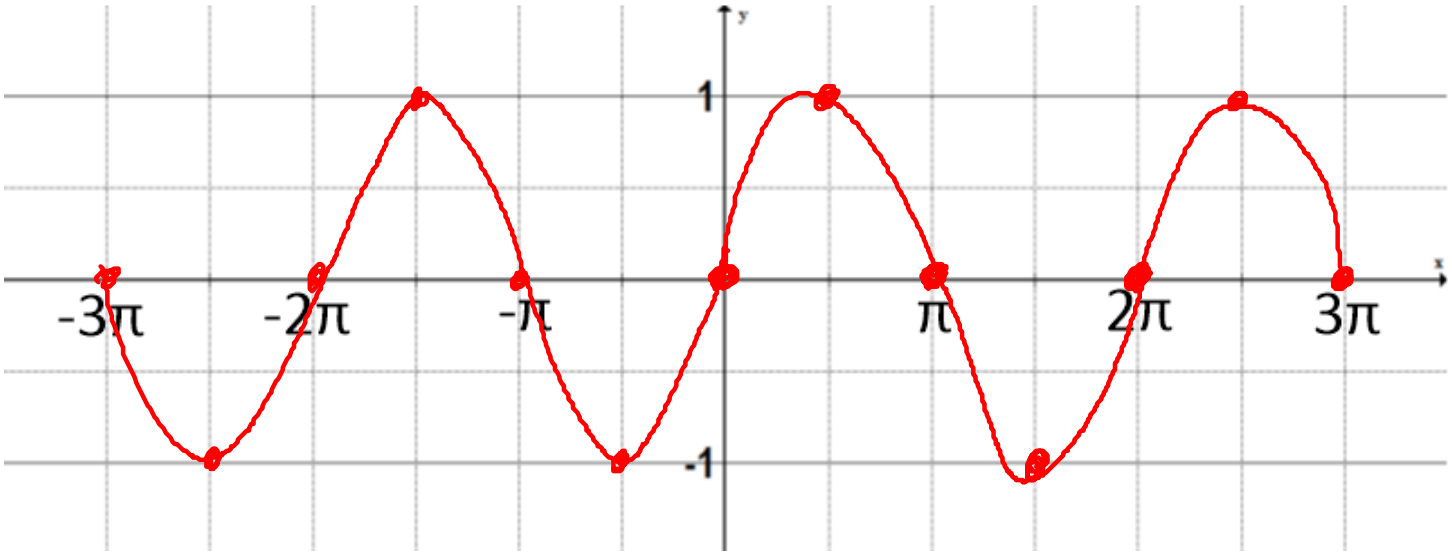
θ	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	π
$\frac{\sin\theta}{\cos\theta}$	0	0.577	1	1.732	undefined	-1.732	-1	-0.577	0

θ	$\frac{7\pi}{6}$	$\frac{5\pi}{4}$	$\frac{4\pi}{3}$	$\frac{3\pi}{2}$	$\frac{5\pi}{3}$	$\frac{7\pi}{4}$	$\frac{11\pi}{6}$	2π
$\frac{\sin\theta}{\cos\theta}$	0.577	1	1.732	undefined	-1.732	-1	-0.577	0

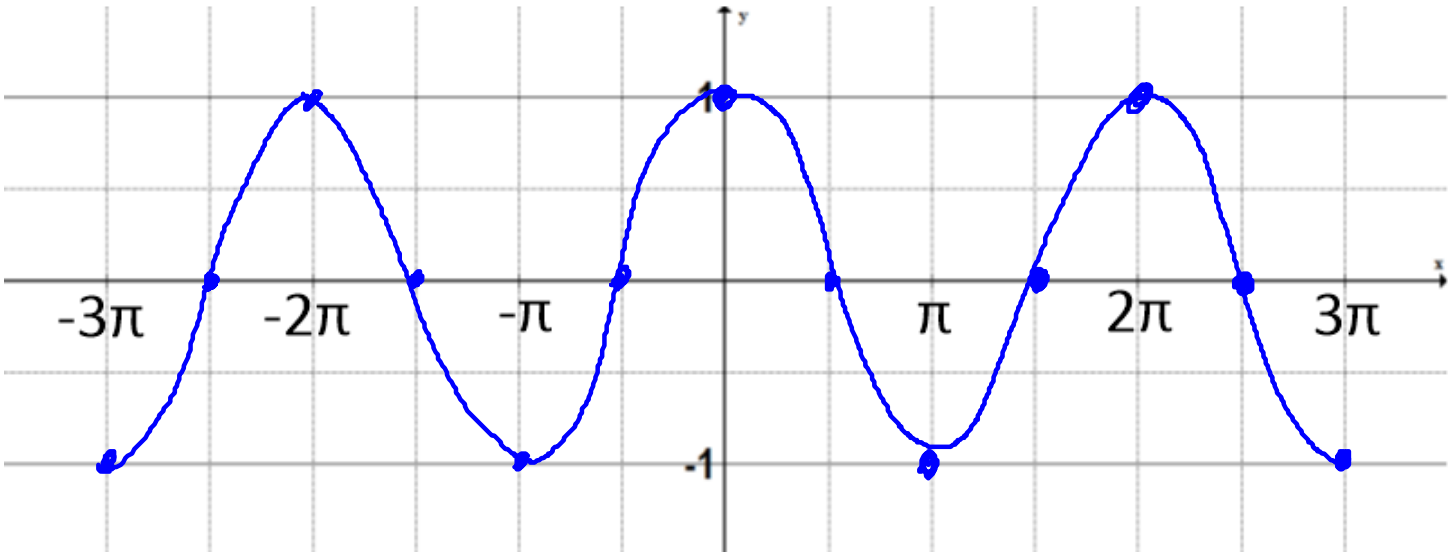


Graphing $\sin\theta$, $\cos\theta$ and $\tan\theta$

$y = \sin\theta$

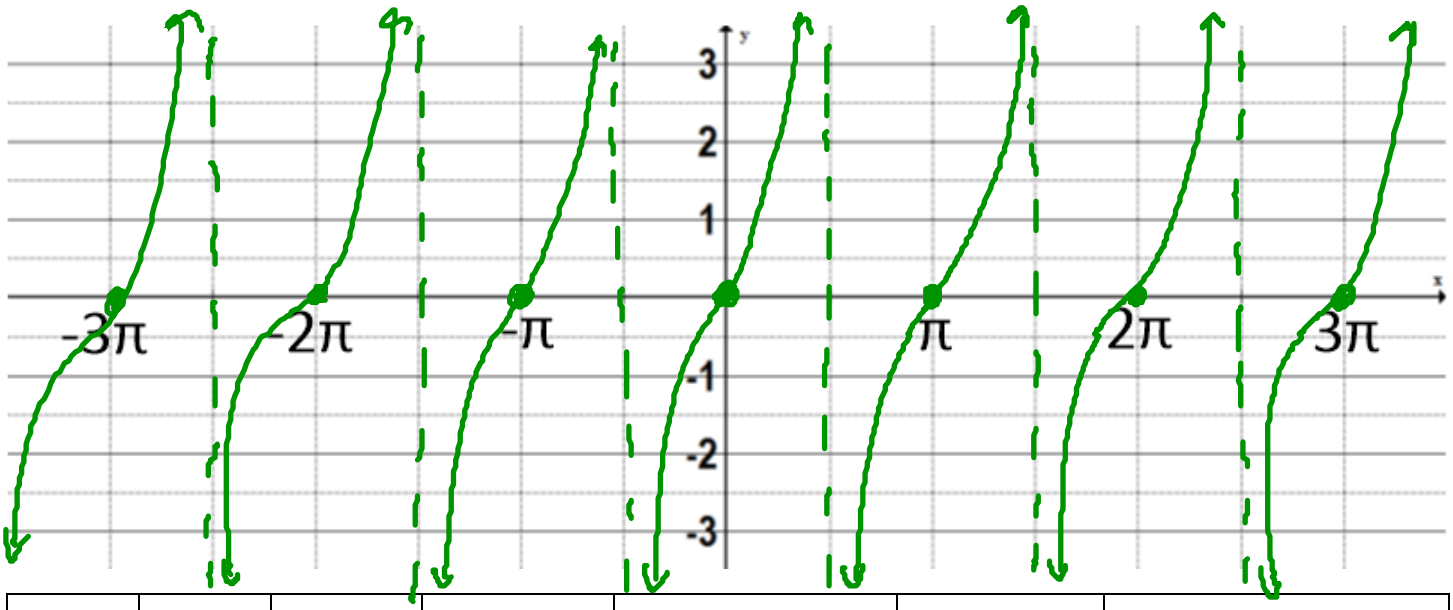


$y = \cos\theta$



	Period	Axis	Amplitude	Max	Min	y-intercept	θ-intercepts
$\sin\theta$	2π	$y=0$	1	1	-1	0	$-3\pi, -2\pi, -\pi, 0, \pi, \ldots$
$\cos\theta$	2π	$y=0$	1	1	-1	1	$\frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}, \ldots$

$y = \tan\theta$



	Period	Axis	Amplitude	Asymptotes	y-intercept	θ-intercepts
$\tan\theta$	π	$y=0$	undefined	$\frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}, \ldots$	0	$0, \pi, 2\pi, \ldots$

Follow-Up Questions

1. Where would the graphs of $\sin\theta$ and $\cos\theta$ intersect?

$\sin\theta = \frac{y}{r}$ $\cos\theta = \frac{x}{r}$ when they intersect $\frac{y}{r} = \frac{x}{r}$ $\therefore x = y$

$\frac{\pi}{4}$ and $\frac{5\pi}{4}$

2. Where would the graphs of $\sin\theta$ and $\tan\theta$ intersect?

$\sin\theta = \frac{\sin\theta}{\cos\theta} \rightarrow \cos\theta = \frac{\sin\theta}{\sin\theta} \rightarrow \cos\theta = 1$

$\cos\theta = \frac{x}{r}$

$0, 2\pi, \pi$

3. At what values of θ is $\tan\theta$ undefined? Explain why $\tan\theta$ is undefined at these values.

$\tan\theta$ is undefined when $\cos\theta = 0$

$\cos\theta = \frac{x}{r}$

$\frac{\pi}{2}, \frac{3\pi}{2}$

4. Explain why the period of $\tan\theta$ is π, whereas the period of $\sin\theta$ and $\cos\theta$ is 2π.