

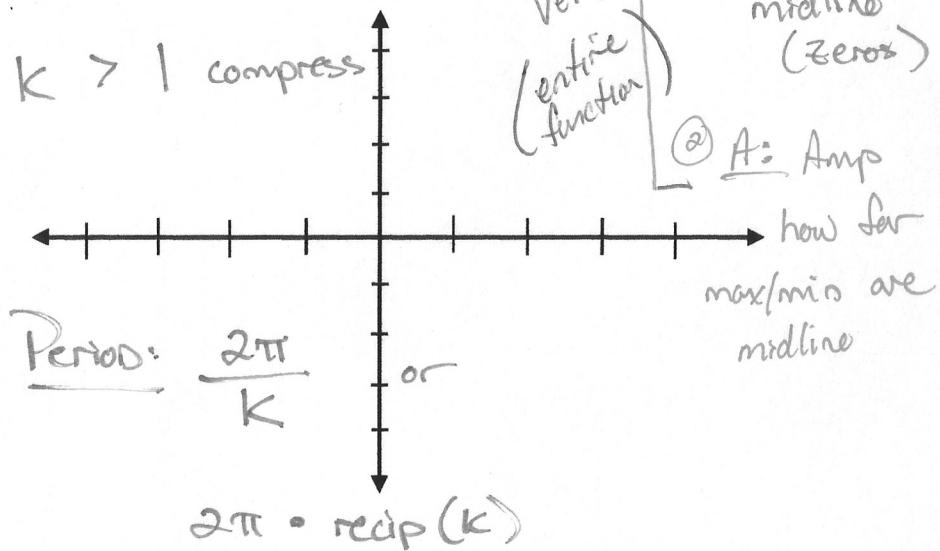
(2π) how long for repeat graph
GRAPHING (PERIOD) CHANGE

$$y = A \sin/\cos k\theta \pm h$$

k affects θ

$k < 1$ stretch

$k > 1$ compress

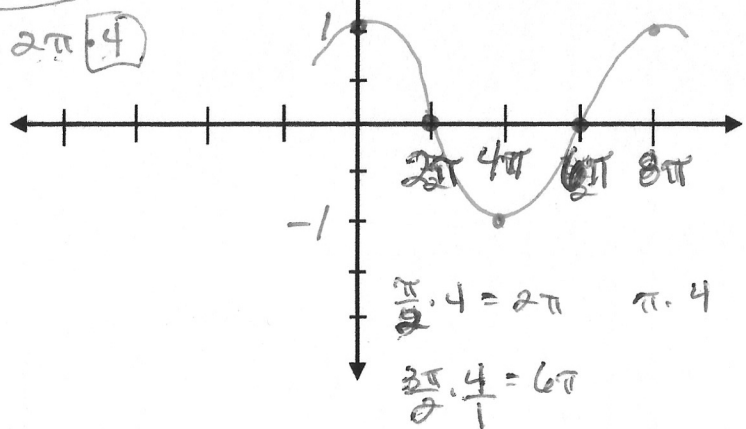


$$y = \cos \frac{1}{4}\theta$$

changes x -axis

$$k = \frac{1}{4}$$

- ① midline
- ② Amp = 1
- ③ Period = 8π



$$y = A \sin/\cos k\theta \pm h$$

Vertical Centre function $\left\{ \begin{array}{l} h: \text{vertical shift (midline) (zeros)} \\ A: \text{Amp (always +) how far from midline} \end{array} \right.$

k : multiply to θ
(affects θ)

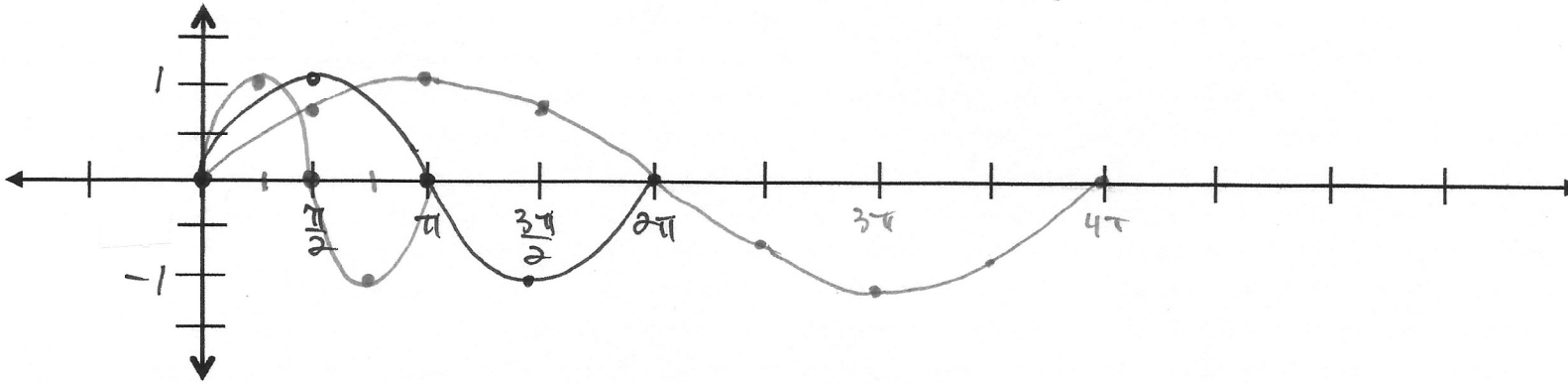
period change
(how long before graph repeats)

$P = \frac{2\pi}{k}$
* if $k < 1$ stretches
 $k > 1$ compresses
most $\rightarrow 2\pi \cdot \text{recip}(k)$

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

$$y = \sin \theta \quad y = \sin \frac{1}{2} \theta$$

θ	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π
$\frac{1}{2}\theta$	$\frac{\pi}{4}$	$\frac{\pi}{2}$	$\frac{3\pi}{4}$	π
$\sin \frac{1}{2}\theta$	$\frac{\sqrt{2}}{2}$	1	$\frac{\sqrt{2}}{2}$	0



$$y = \sin 2\theta$$

$$2\left(\frac{\pi}{2}\right) = \pi$$

$$2\left(\frac{\pi}{4}\right) = \frac{\pi}{2}$$

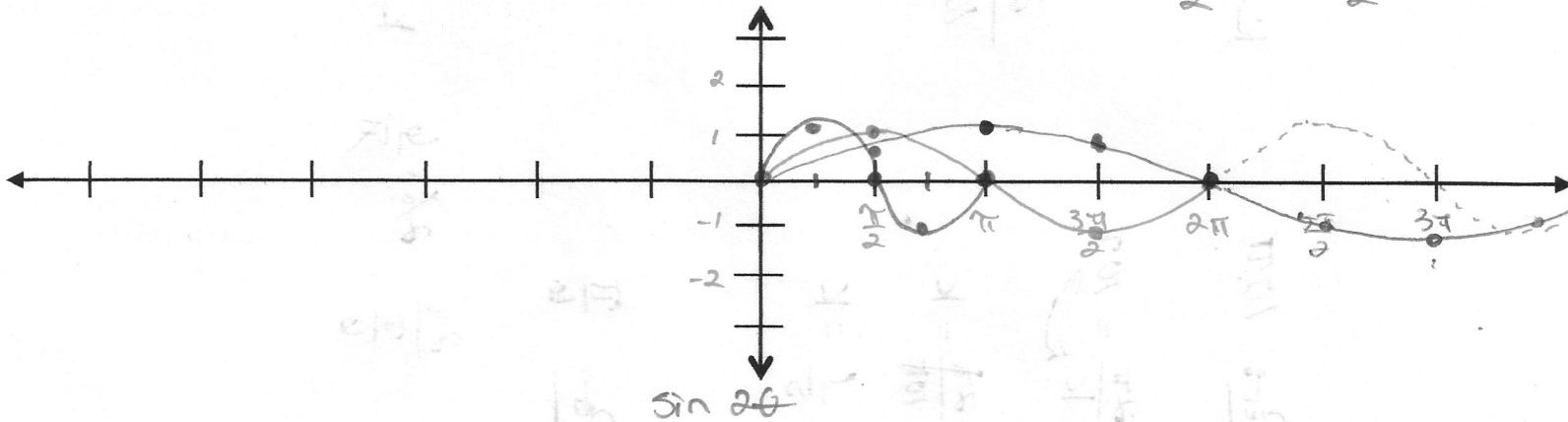
$$2(\pi) = 2\pi$$

$$y = \sin \frac{1}{2} \theta$$

$$y = \sin \theta$$

$$\frac{2\pi}{\frac{1}{2}} = 2\pi \cdot 2$$

θ	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π
$\frac{1}{2}\theta$	$\frac{\pi}{4}$	$\frac{\pi}{2}$	$\frac{3\pi}{4}$	π
$\sin \frac{1}{2}\theta$	$\frac{\sqrt{2}}{2}$	1	$\frac{\sqrt{2}}{2}$	0



$$\sin 2\theta$$

$$2\left(\frac{\pi}{4}\right) = \frac{\pi}{2}$$

$$2\left(\frac{\pi}{2}\right) = \pi$$

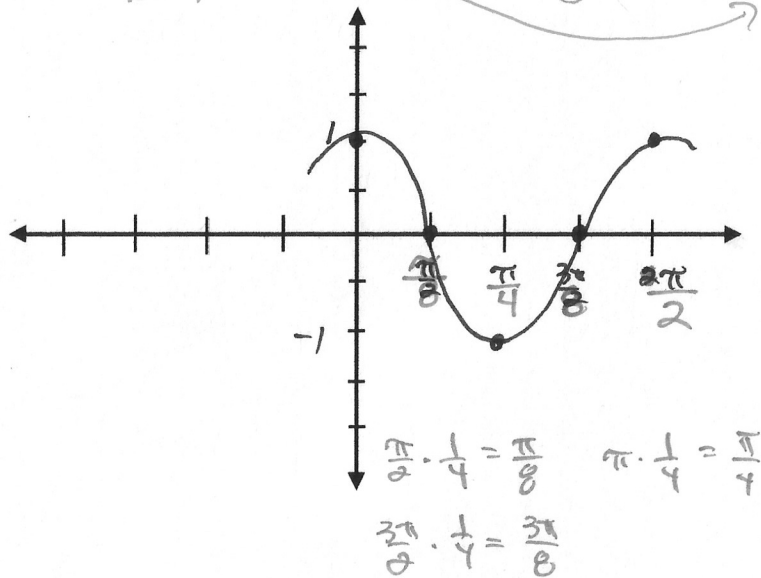
$$\frac{2\pi}{2} = \pi$$

$$2\pi \cdot \frac{1}{2}$$

GRAPHING PERIOD CHANGE

$$y = \frac{\cos 4\theta}{k=4}$$

v.s. 0 — Amp 1
Per $2\pi \cdot \left(\frac{1}{4}\right) = \frac{2\pi}{4} = \frac{\pi}{2}$



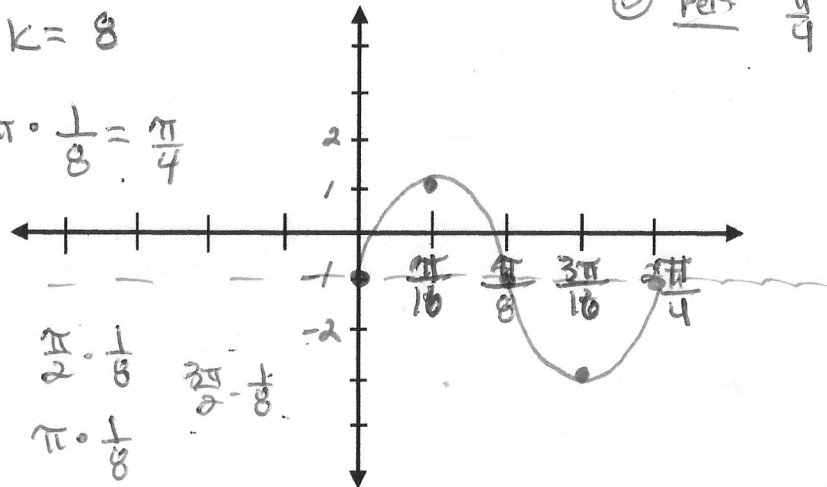
GRAPHING PERIOD CHANGE

$$y = 2 \sin 8\theta \boxed{-1}$$

- ① v.s. -1
- ② Amp: 2
- ③ Per $\frac{\pi}{4}$

$k=8$

$$2\pi \cdot \frac{1}{8} = \frac{\pi}{4}$$



$$y = 2 \sin \frac{1}{6}\theta - 1$$

v.s: -1
A: 2
Per $2\pi \cdot 6 = 12\pi$
 $k = \frac{1}{6}$

