Mathematics 11U

6.2 – Sinusoidal Functions

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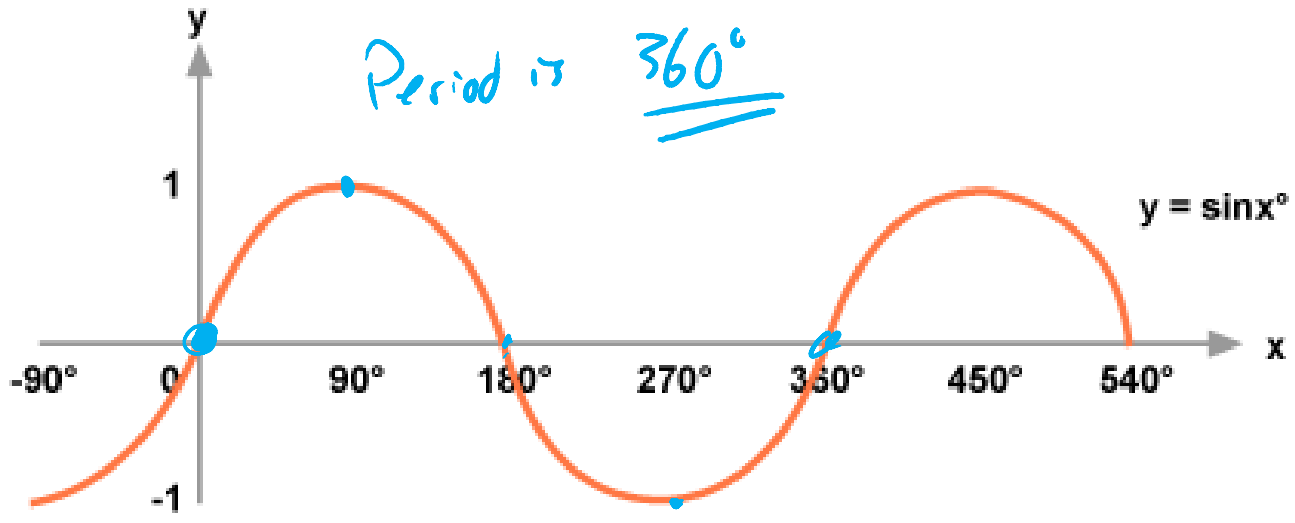
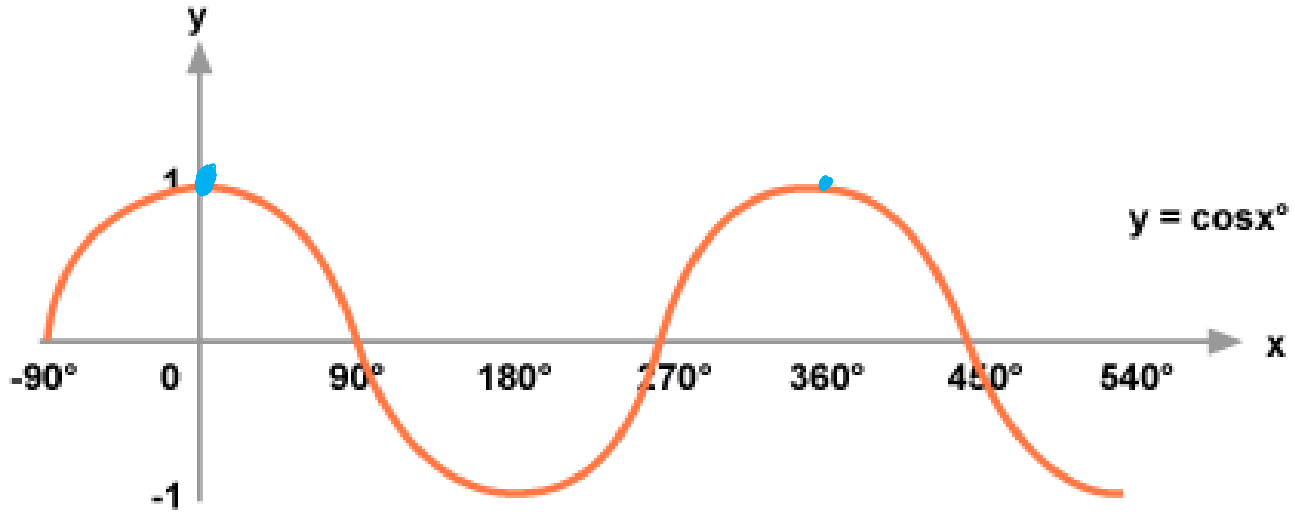
What do the graphs of: $f(\theta) = \sin\theta$ and $f(\theta) = \cos\theta$ look like?



Period is 360°

x	sinx
0	0
90	1
180	0
270	-1
360	0



x	cosx
0	1
90	0
180	-1
270	0
360	1

Function	$f(x) = 3\sin(2x - 180) + 1$
Proper Function	$f(x) = \overset{a}{3}\sin\left(\overset{k}{2}(x - \overset{d}{90})\right) \overset{c}{+1}$
Amplitude $= \lvert a \rvert$	$\lvert 3 \rvert = 3$
Period $\frac{360}{k}$	$\frac{360}{2} = 180^\circ$
Phase Shift d	90°
Equation of Axis $y = c$	$y = 1$
Domain (2 cycles)	$0^\circ \le x \le 360^\circ$
Range	Trough $= 1 - 3 = -2$ Peak $= 1 + 3 = 4$ $-2 \le f(x) \le 4$

Start
$(90^\circ, 1)$

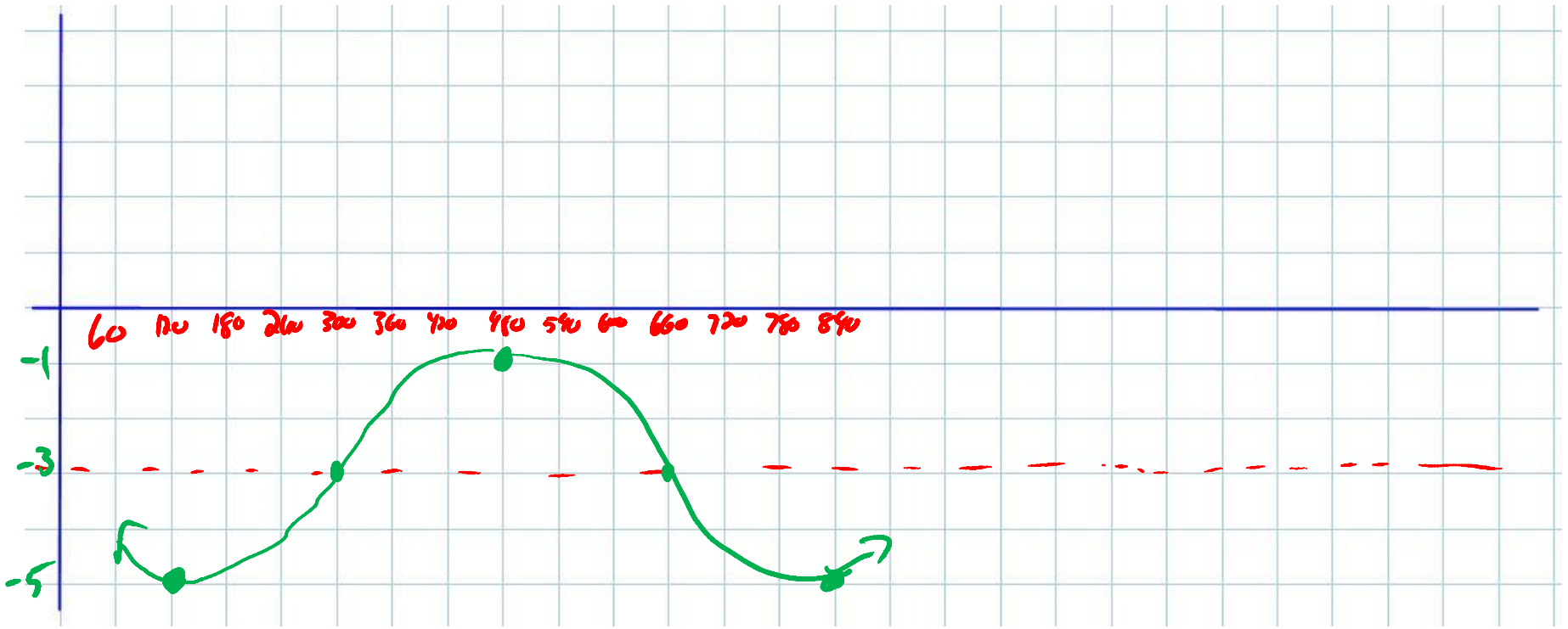

90 60 90 120 150 180 210 240 270 300

Function	$f(x) = -2\cos\left(\frac{1}{2}x - 60\right) - 3$
Proper Function	$f(x) = -2\cos\left(\frac{1}{2}(x-120)\right) - 3$
Amplitude $\lvert a \rvert$	$\lvert -2 \rvert = 2$
Period $\frac{360}{k}$	$\frac{360}{1/2} = 720$
Phase Shift d	120
Equation of Axis $y = c$	$y = -3$
Domain (2 cycles)	$0^\circ \le x \le 1440^\circ$
Range	T: $-3 - 2 = -5$ P: $-3 + 2 = -1$

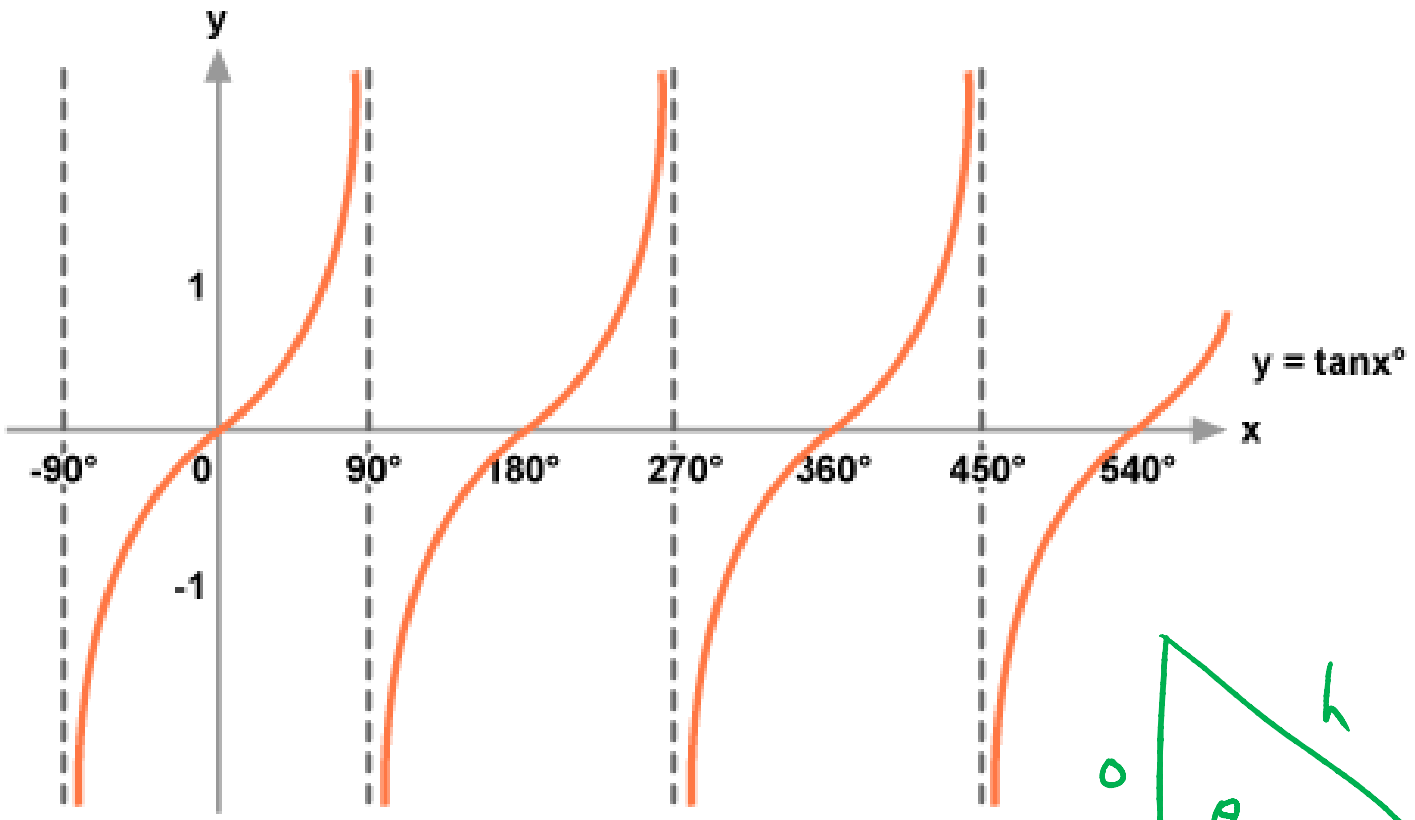
+cos = Peak

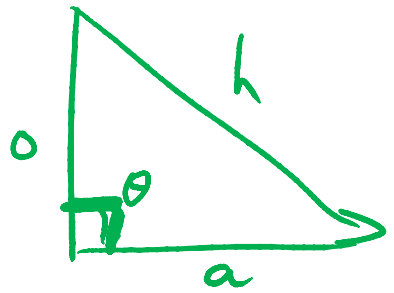
−cos = Trough

(120, −5)


60
120
180
240
300
360
420
480
540
600
660
720
780
840
-1
-3
-5

What about $f(\theta) = \tan\theta$?





$\tan\theta = \frac{o}{a}$