

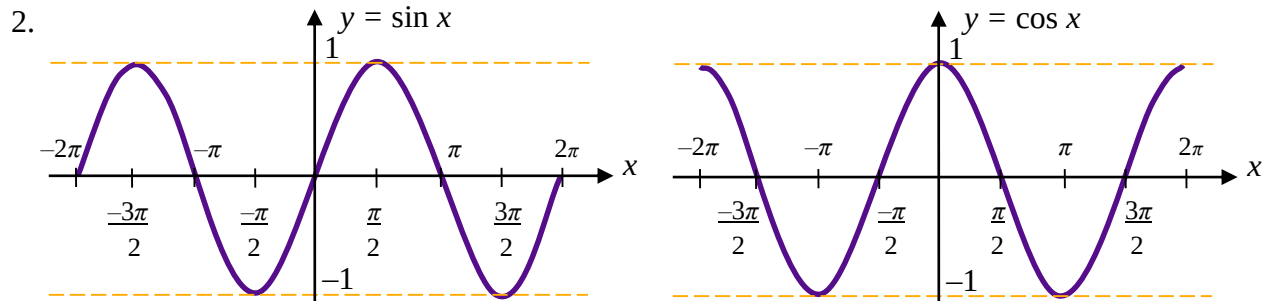


Activity 6.1 – The Cosine and Sine Functions

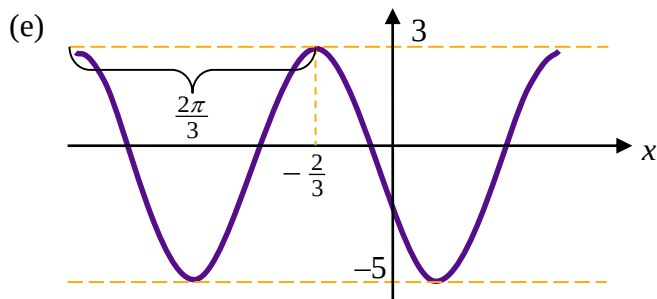
1.

θ	$x = \cos \theta$	$y = \sin \theta$
$0 = 0^\circ$	1	0
$\frac{\pi}{6} = 30^\circ$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$
$\frac{\pi}{4} = 45^\circ$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$
$\frac{\pi}{3} = 60^\circ$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$
$\frac{\pi}{2} = 90^\circ$	0	1

θ	$\cos \theta$	$\sin \theta$	$\tan \theta$
$0 = 0^\circ$	1	0	0
$\frac{\pi}{6} = 30^\circ$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{3}$
$\frac{\pi}{4} = 45^\circ$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1
$\frac{\pi}{3} = 60^\circ$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\sqrt{3}$
$\frac{\pi}{2} = 90^\circ$	0	1	undefined
$\pi = 180^\circ$	-1	0	0
$\frac{3\pi}{2} = 270^\circ$	0	-1	undefined
$\frac{5\pi}{6} = 150^\circ$	$-\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$-\frac{\sqrt{3}}{3}$
$\frac{4\pi}{3} = 240^\circ$	$-\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$\sqrt{3}$



3. (a) 4; (b) $\frac{2\pi}{3}$; (c) $-\frac{2}{3}$; (d) $y = -1$;



4. (a) $A = (3.96 - 1.60)/2 = 1.18$; $B = 2\pi/11$; $C = 0$; $D = (3.96 + 1.60)/2 = 2.78$; the model is $h(t) = 1.18\cos(\frac{2\pi}{11}t) + 2.78$ meters, where t is hours after 9:00 a.m. on July 22.
 (b) $h(18) \approx 2.01$ meters; $h(47) \approx 2.61$ meters
 (c) $C/B = -3$, so $C = -6\pi/11$; the model is $H(t) = 1.18\cos(\frac{2\pi}{11}t + \frac{6\pi}{11}) + 2.78$ meters, where t is hours after noon on July 22.