

Day 10: Graphs of Sine, Cosine and Tangent

Warm-up: Solve the trig equations:

1.) $1 + \cos(x) = 0$
 $\cos(x) = -1$
 $x = 180^\circ$

2.) $2\sin(x)\cos(x) + \cos(x) = 0$
 $\cos(x)(2\sin(x) + 1) = 0$
 $\cos(x) = 0$ or $2\sin(x) + 1 = 0$
 $x = 90^\circ$ or $x = -30^\circ$

3.) Find the area of the triangle if $b = 11$, $a = 8$, and Angle $C = 37^\circ$.

Area = $\frac{1}{2}ab\sin C = \frac{1}{2}(8)(11)\sin(37^\circ) = 26.5$ Units²

4.) Solve the triangle in problem #3.



SAS - Law of Cosine

① $c^2 = 8^2 + 11^2 - 2(8)(11)\cos(37^\circ)$

$c^2 = 94.44$
 $c = 6.67$

*Think BIG for step 1

② $\frac{\sin(37^\circ)}{6.67} = \frac{\sin A}{8}$

short side second with sines

$A = \sin^{-1}\left(\frac{8\sin(37^\circ)}{6.67}\right)$

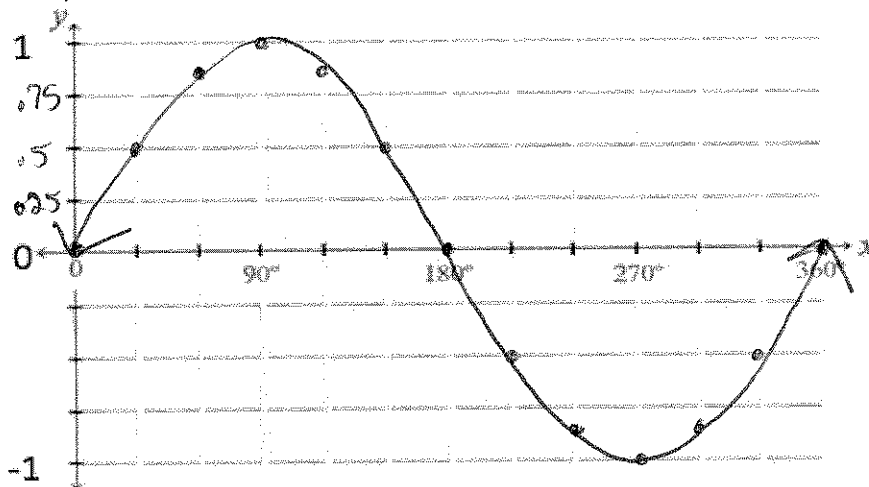
$A = 46.20^\circ$

③ $180 - 46.20 - 37 = 96.8^\circ = B$

Complete the table below: Make sure your calculator is in degree mode!!

Degree	sin(x)	Point (Degree, sin(x))
0	0	(0, 0)
30	0.5	(30, 0.5)
60	0.866	(60, 0.866)
90	1	(90, 1)
120	0.866	(120, 0.866)
150	0.5	(150, 0.5)
180	0	(180, 0)
210	-0.5	(210, -0.5)
240	-0.866	(240, -0.866)
270	-1	(270, -1)
300	-0.866	(300, -0.866)
330	-0.5	(330, -0.5)
360	0	(360, 0)

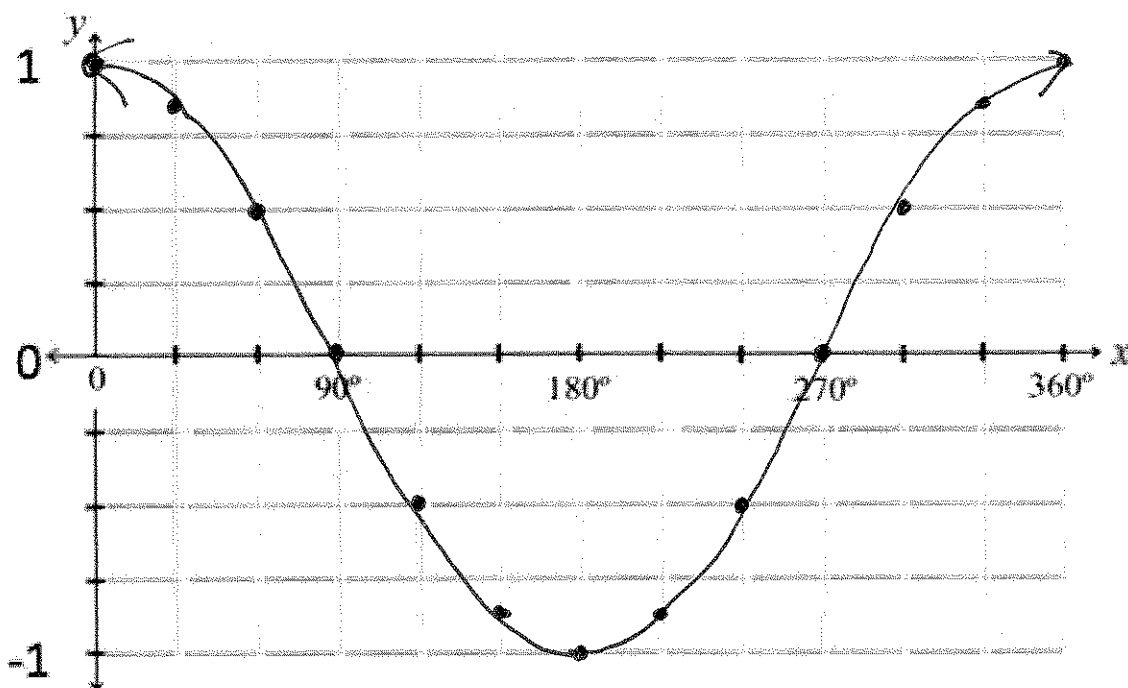
Using the points above (degree, sin(x)), sketch a graph of $y = \sin(x)$.



3. Complete the table below:

Degree	Cos(x)	Point (Degree, Cos(x))
0	1	(0,1)
30	0.866	(30, 0.866)
60	0.5	(60, 0.5)
90	0	(90, 0)
120	-0.5	(120, -0.5)
150	-0.866	(150, -0.866)
180	-1	(180, -1)
210	-0.866	(210, -0.866)
240	-0.5	(240, -0.5)
270	0	(270, 0)
300	0.5	(300, 0.5)
330	0.866	(330, 0.866)
360	1	(360, 1)

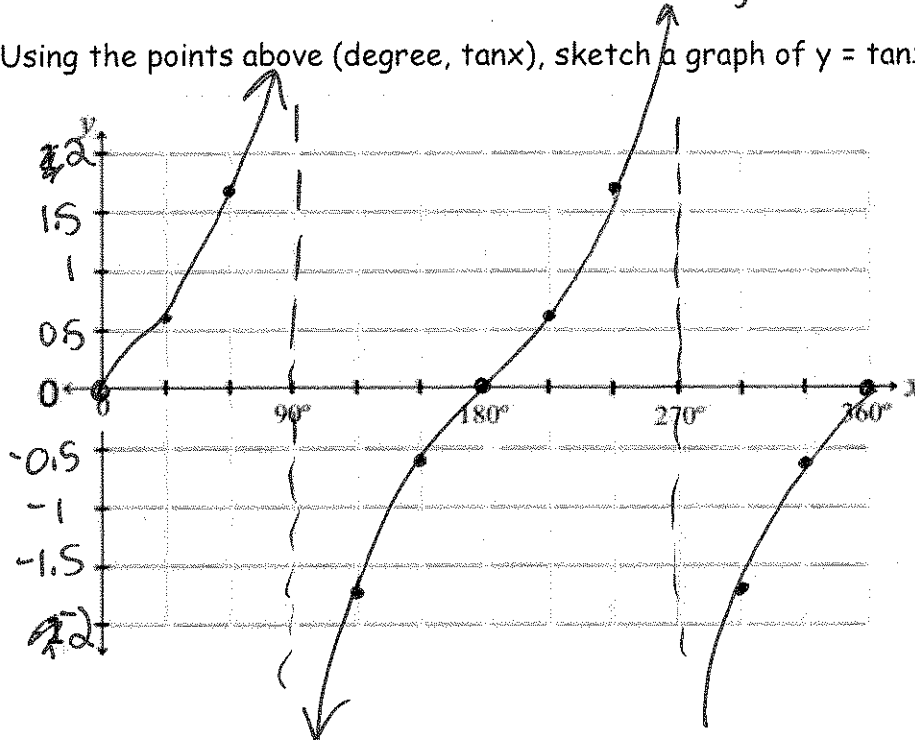
4. Using the points above (degree, cosx), sketch a graph of $y = \cos(x)$.



5. Complete the table below:

Degree	Tan(x)	Point (Degree, Tan(x))
0	0	(0,0)
30	0.577	(30, 0.577)
60	1.732	(60, 1.732)
90	error=undefined	(90, error)
120	-1.732	(120, -1.732)
150	-0.577	(150, -0.577)
180	0	(180, 0)
210	0.577	(210, 0.577)
240	1.732	(240, 1.732)
270	error=undefined	(270, error)
300	-1.732	(300, -1.732)
330	-0.577	(330, -0.577)
360	0	(360, 0)

6. Using the points above (degree, tanx), sketch a graph of $y = \tan x$.



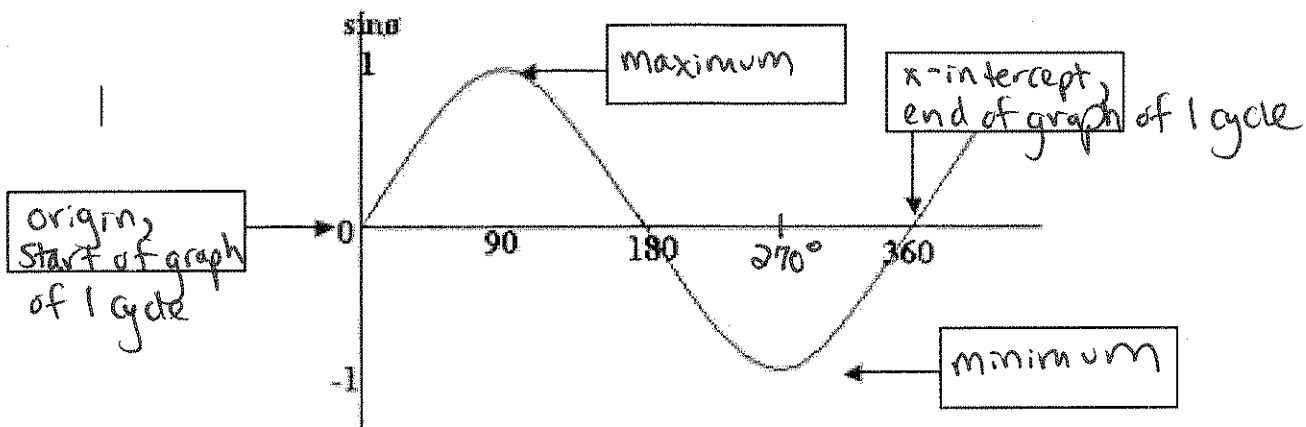
What happens to tangent at 90° and 270°? Why is this happening?

a vertical asymptote; because $\tan(90) = \tan(270) = \text{undefined}$
 because $\tan(x) = \frac{\sin(x)}{\cos(x)}$ and $\cos(90) = 0$
 $\cos(270) = 0$

Day 10 Notes: The Graphs of Sine, Cosine, and Tangent

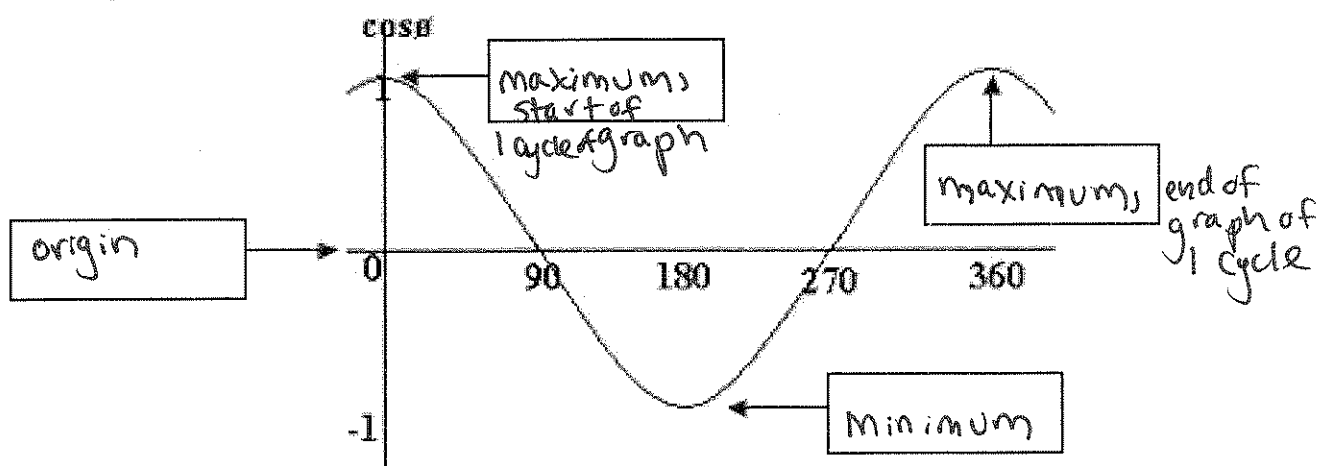
Note: The words increasing, decreasing, positive, and negative describe the range (the y-values) so you report the domain (the x-values) when that occurs

I. Sine Graph



- a. Sine is increasing: $(0, 90) \cup (270, 360)$
- b. Sine is decreasing: $(90, 270)$
- c. Sine is positive: $(0, 180)$
- d. Sine is negative: $(180, 360)$

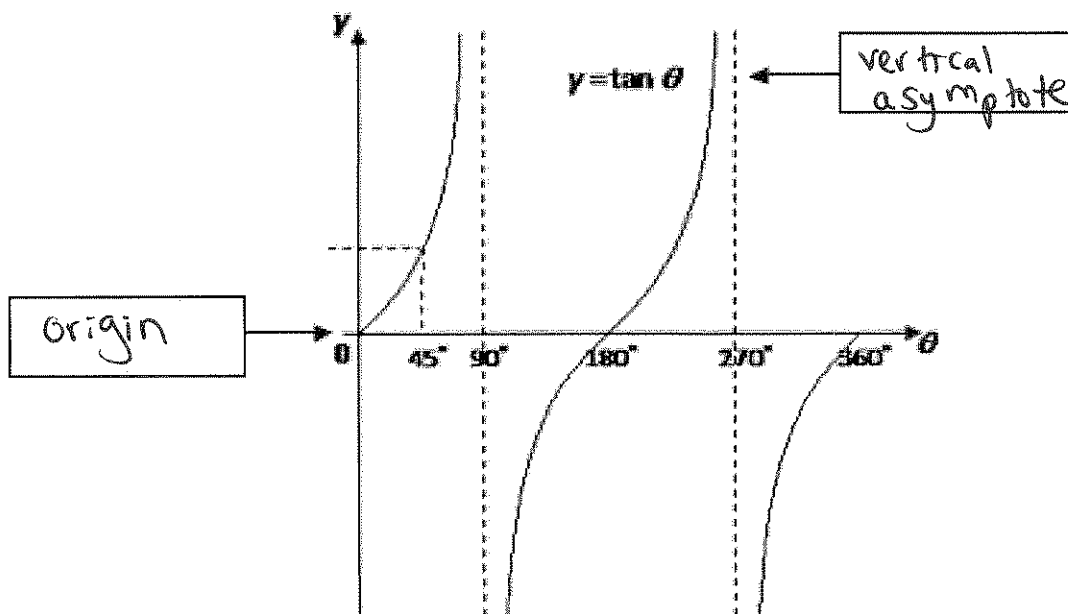
II. Cosine Graph



- a. Cosine is increasing: $(180, 360)$
- b. Cosine is decreasing: $(0, 180)$
- c. Cosine is positive: $(0, 90) \cup (270, 360)$
- d. Cosine is negative: $(90, 270)$

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III. Tangent Graph



- a. Tangent is increasing: $(0, 90) \cup (180, 270)$
 b. Tangent is decreasing: _____
 c. Tangent is positive: $(0, 90) \cup (180, 270)$
 d. Tangent is negative: $(90, 180) \cup (270, 360)$