

5.5 Graphing sine and cosine functions

GOALS:

1. Recognize that $f(x) = \sin x$ and $g(x) = \cos x$ are functions. (Each value of x results in exactly 1 y -value.)
2. For both functions, the domain is the set of real numbers; and the range is $-1 \leq y \leq 1$
3. Both functions are periodic and repeat after a period of 2π
4. For $f(x) = A_1 \sin x$ and $g(x) = A_2 \cos x$ the domain is all real numbers, the period is 2π , but the range is $-A_1 \leq y \leq A_1$ and $-A_2 \leq y \leq A_2$ respectively.
5. For $f(x) = A_1 \sin B_1 x$ and $g(x) = A_2 \cos B_2 x$ the period changes to $2\pi/B_1$ and $2\pi/B_2$, respectively, the range remains $-A_1 \leq y \leq A_1$ and $-A_2 \leq y \leq A_2$ respectively.
6. $f(x) = A_1 \sin(B_1 x - C_1) + D_1$ and $g(x) = A_2 \cos(B_2 x - C_2) + D_2$
 - C shifts right and left, D shifts up and down

Study 5.5 CVC#1-5,6,9,10; # 1-9, 31-35, 39, 75, 77, 78, 85

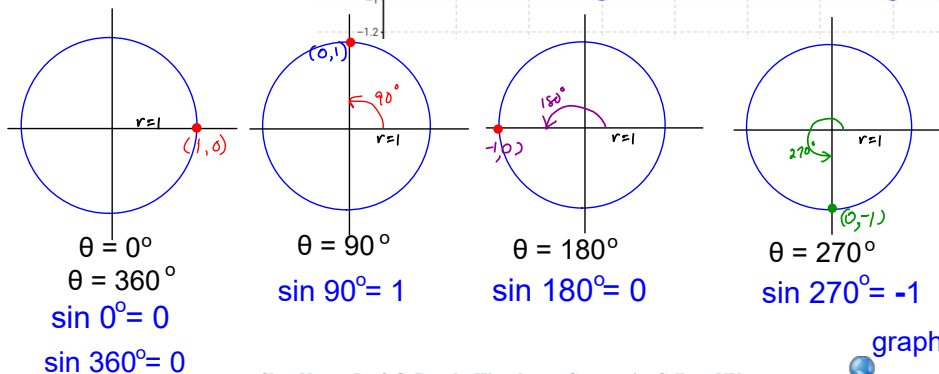
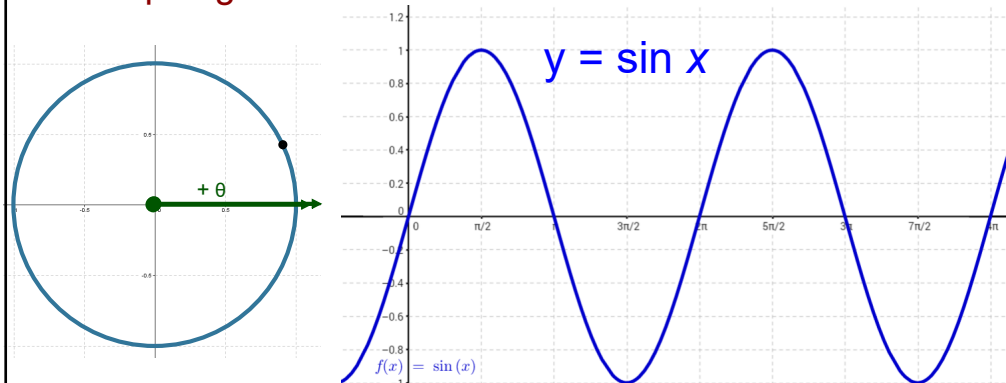
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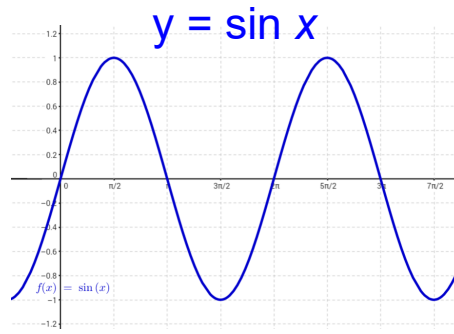
graphing ppt

graphing video

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$$y = A \sin(Bx - C) + D$$

VIKES!



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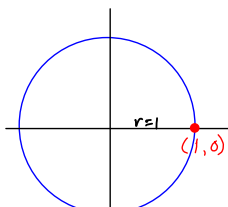
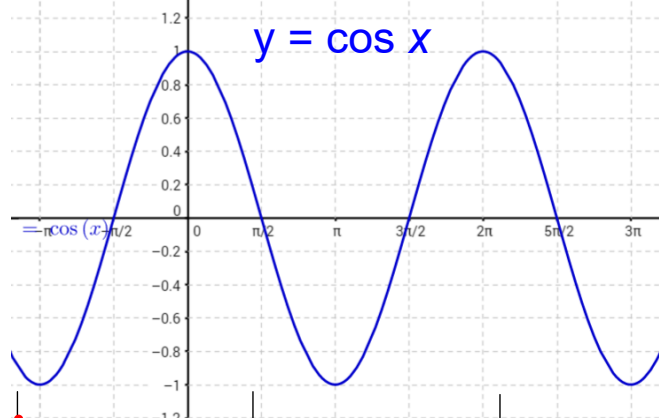
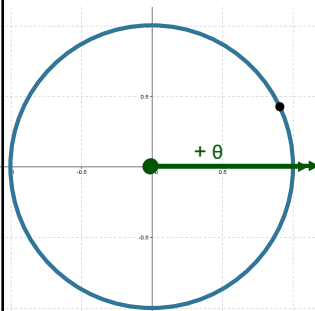
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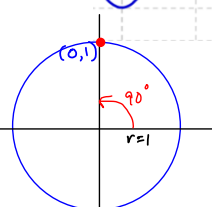
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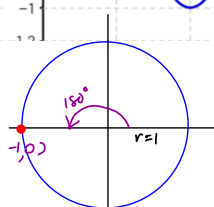
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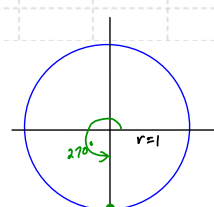
$\theta = 0^\circ$
 $\theta = 360^\circ$
 $\cos 0^\circ = 1$
 $\cos 360^\circ = 1$



$\theta = 90^\circ$
 $\cos 90^\circ = 0$



$\theta = 180^\circ$
 $\cos 180^\circ = -1$



$\theta = 270^\circ$
 $\cos 270^\circ = 0$

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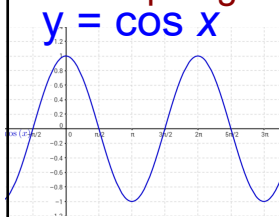
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5.5 Graphing sine and cosine functions



- Try a few examples: [graphing function](#)
1. Click on:
 2. Click off $g(x)$ and $h(x)$
 3. In INPUT box, enter functions:

Try:

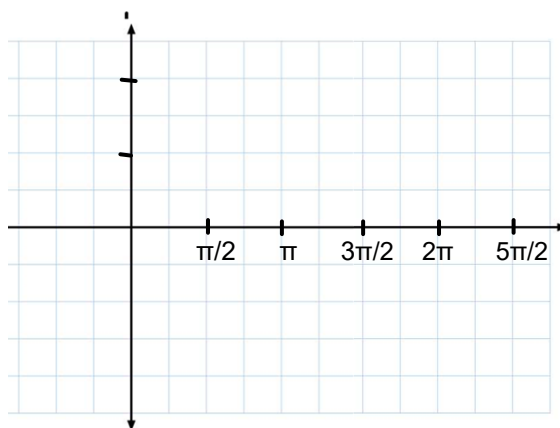
1. $f(x) = \sin x$
2. $f(x) = 2 \cos x$
3. $f(x) = 0.5 \sin x + 1$
4. $f(x) = \sin 2x$
5. $f(x) = -3 \sin x$
6. $f(x) = \cos 0.5x$

5.5 Graphing sine and cosine functions [graphing function](#)

1. $f(x) = \sin x$

$a = \underline{\quad}$, period = $2\pi / \underline{\quad} = \underline{\quad}$

x	$\sin x$
0	
$\pi/2$	
π	
$3\pi/2$	
2π	

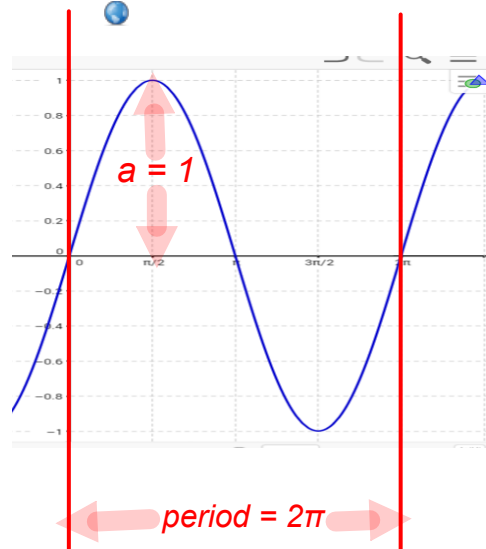


5.5 Graphing sine and cosine functions *graphing function*

1. $f(x) = \sin x$

$a = 1$, period = $2\pi/1 = 2\pi$

x	$\sin x$
0	0
$\pi/2$	1
π	0
$3\pi/2$	-1
2π	0



- Try:
- $f(x) = \sin x$
 - $f(x) = 2 \cos x$
 - $f(x) = 0.5 \sin x + 1$
 - $f(x) = \sin 2x$
 - $f(x) = -3 \sin x$
 - $f(x) = \cos 0.5x$

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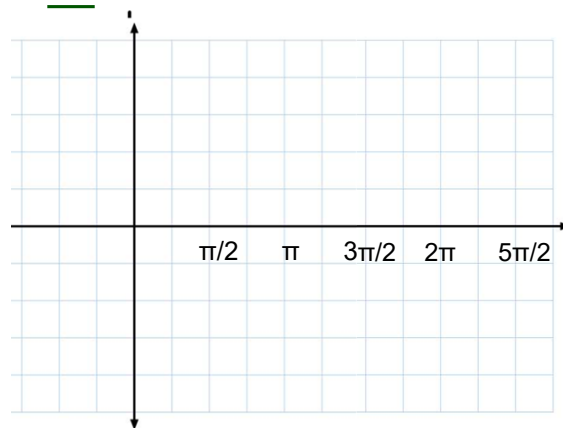
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5.5 Graphing sine and cosine functions *graphing function*

2. $f(x) = 2 \cos x$

$a = \underline{\quad}$, period = $2\pi/\underline{\quad} = \underline{\quad}$

x	$\cos x$	$2 \cos x$
0	1	
$\pi/2$		
π	-1	
$3\pi/2$	0	0
2π		



- Try:
- $f(x) = \sin x$
 - $f(x) = 2 \cos x$
 - $f(x) = 0.5 \sin x + 1$
 - $f(x) = \sin 2x$
 - $f(x) = -3 \sin x$
 - $f(x) = \cos 0.5x$

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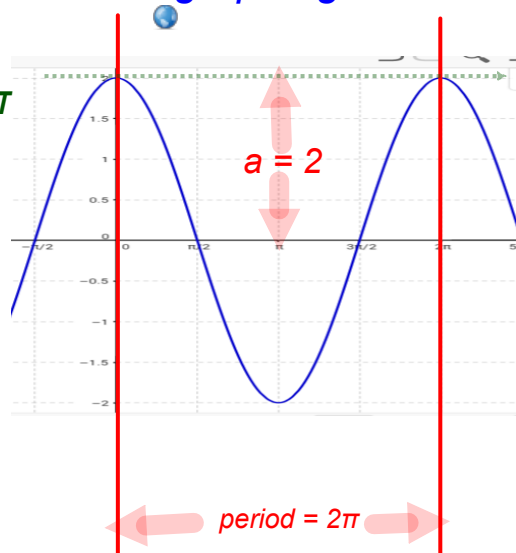
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5.5 Graphing sine and cosine functions *graphing function*

2. $f(x) = 2 \cos x$

$a = 2$, period = $2\pi/1 = 2\pi$

x	$\cos x$	$2 \cos x$
0	1	2
$\pi/2$	0	0
π	-1	-2
$3\pi/2$	0	0
2π	1	2



- Try:
- $f(x) = \sin x$
 - $f(x) = 2 \cos x$
 - $f(x) = 0.5 \sin x + 1$
 - $f(x) = \sin 2x$
 - $f(x) = -3 \sin x$
 - $f(x) = \cos 0.5x$

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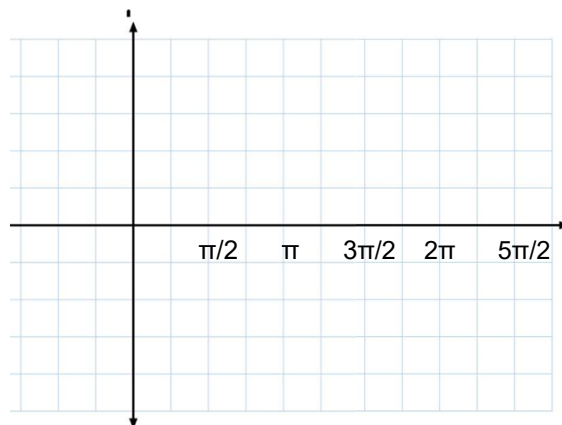
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3. $f(x) = 0.5 \sin x + 1$

$a = 0.5$, period = $2\pi/1 = 2\pi$

x	$\sin x$	$0.5 \sin x + 1$
0	0	$0+1=1$
$\pi/2$	1	
π	0	
$3\pi/2$	-1	
2π	0	



- Try:
- $f(x) = \sin x$
 - $f(x) = 2 \cos x$
 - $f(x) = 0.5 \sin x + 1$
 - $f(x) = \sin 2x$
 - $f(x) = -3 \sin x$
 - $f(x) = \cos 0.5x$

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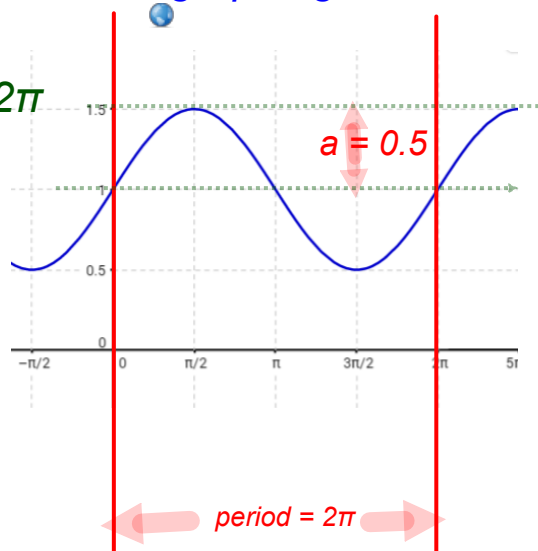
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5.5 Graphing sine and cosine functions *graphing function*

3. $f(x) = 0.5 \sin x + 1$

$a = 0.5$, period = $2\pi/1 = 2\pi$

x	$\sin x$	$0.5\sin x + 1$
0	0	$0+1=1$
$\pi/2$	1	$0.5+1=1.5$
π	0	$0+1=1$
$3\pi/2$	-1	$-0.5+1=0.5$
2π	0	$0+1=1$



Try:

- $f(x) = \sin x$
- $f(x) = 2 \cos x$
- $f(x) = 0.5 \sin x + 1$
- $f(x) = \sin 2x$
- $f(x) = -3 \sin x$
- $f(x) = \cos 0.5x$

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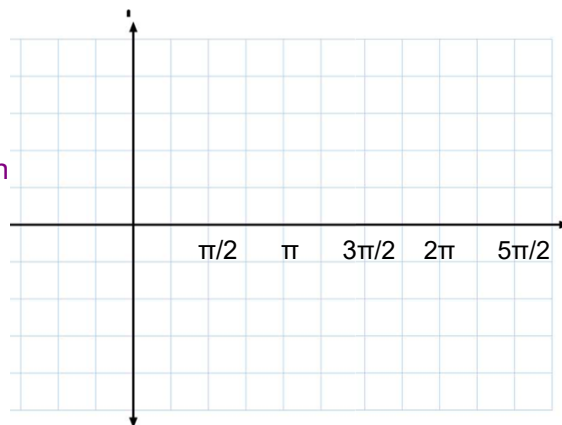
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4. $f(x) = \sin 2x$

$a = 1$, period = $2\pi/2 = \pi$

x	$2x$	$\sin 2x$
0	0	0
$\pi/2$	π	0
π	2π	0
$3\pi/2$	3π	0
2π	4π	0
$\pi/4$		
$3\pi/4$	$3\pi/2$	

need between values



Try:

- $f(x) = \sin x$
- $f(x) = 2 \cos x$
- $f(x) = 0.5 \sin x + 1$
- $f(x) = \sin 2x$
- $f(x) = -3 \sin x$
- $f(x) = \cos 0.5x$

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5.5 Graphing sine and cosine functions *graphing function*

4. $f(x) = \sin 2x$

$a = 1$, period = $2\pi/2 = \pi$

x	$2x$	$\sin 2x$
0	0	0
$\pi/2$	π	0
π	2π	0
$3\pi/2$	3π	0
2π	4π	0

need between values

$\pi/4$	$\pi/2$	1
$3\pi/4$	$3\pi/2$	-1

Try:

- $f(x) = \sin x$
- $f(x) = 2 \cos x$
- $f(x) = 0.5 \sin x + 1$
- $f(x) = \sin 2x$
- $f(x) = -3 \sin x$
- $f(x) = \cos 0.5x$

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5. $f(x) = -3 \sin x$

$a = 3$, period = $2\pi/1 = 2\pi$

x	$\sin x$	$-3\sin x$
0		
$\pi/2$		
π		
$3\pi/2$		
2π		

Try:

- $f(x) = \sin x$
- $f(x) = 2 \cos x$
- $f(x) = 0.5 \sin x + 1$
- $f(x) = \sin 2x$
- $f(x) = -3 \sin x$
- $f(x) = \cos 0.5x$

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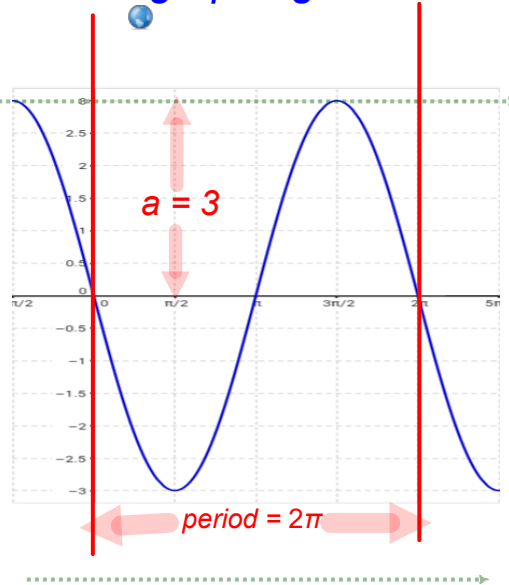
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5. $f(x) = -3 \sin x$

$a = 3, \text{ period} = 2\pi/1 = 2\pi$

x	$\sin x$	$-3\sin x$
0	0	0
$\pi/2$	1	-3
π	0	0
$3\pi/2$	-1	3
2π	0	0



Try:

- $f(x) = \sin x$
- $f(x) = 2 \cos x$
- $f(x) = 0.5 \sin x + 1$
- $f(x) = \sin 2x$
- $f(x) = -3 \sin x$
- $f(x) = \cos 0.5x$

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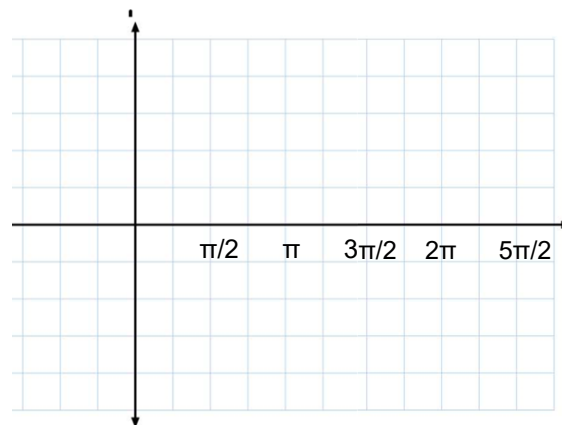
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5.5 Graphing sine and cosine functions *graphing function*

6. $f(x) = \cos 0.5x$

$a = 1, \text{ period} = 2\pi/0.5 = 4\pi$

x	$0.5x$	$\cos 0.5x$
0	0	
π	$\pi/2$	
2π		
3π	$3\pi/2$	
4π		



Try:

- $f(x) = \sin x$
- $f(x) = 2 \cos x$
- $f(x) = 0.5 \sin x + 1$
- $f(x) = \sin 2x$
- $f(x) = -3 \sin x$
- $f(x) = \cos 0.5x$

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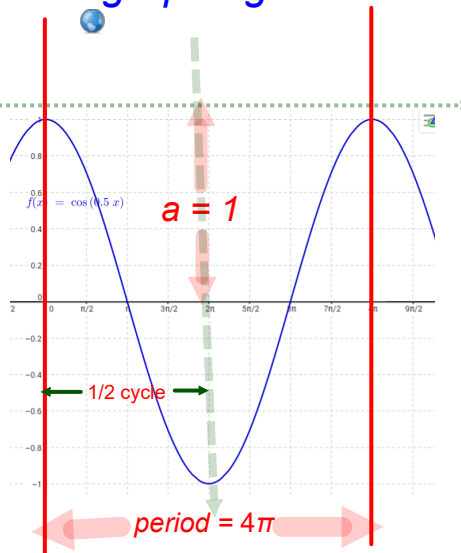
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6. $f(x) = \cos 0.5x$

$a = 1$, period = $2\pi/0.5 = 4\pi$

x	$0.5x$	$\cos 0.5x$
0	0	1
π	$\pi/2$	0
2π	π	-1
3π	$3\pi/2$	0
4π	2π	1



Try:

1. $f(x) = \sin x$
2. $f(x) = 2 \cos x$
3. $f(x) = 0.5 \sin x + 1$
4. $f(x) = \sin 2x$
5. $f(x) = -3 \sin x$
6. $f(x) = \cos 0.5x$ ○

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Attachments

basic_angles.mp4

trig_functions_unitCircle.mp4