GRADE 11

Trigonometry

WEBSITE NOTES

TOPIC: Trig functions and revision grade 10 trigonometry

- Basic graphs defined by $y = a \sin x$, $y = a \cos x$ and $y = \tan x$ for $\theta \in [-360^0 ; 360^0]$
- Investigate the effect of k and p on the graphs of the functions defined by:
  $y = \sin(kx)$, $y = \cos(kx)$, $y = \tan(kx)$
- $y = \sin(x + p)$, $y = \cos(x + p)$, $y = \tan(x + p)$)

Exercise 1 Answers

Exercise 1

1

1.1

X	y	x	y	x	y	x	y	x	y	x	y	x	y
-360	1	-330	$\frac{\sqrt{3}}{2}$	-300	$\frac{1}{2}$	-270	0	-240	$-\frac{1}{2}$	-210	$-\frac{\sqrt{3}}{2}$		
-180	-1	-150	$-\frac{\sqrt{3}}{2}$	-120	$-\frac{1}{2}$	-90	0	-60	$\frac{1}{2}$	-30	$\frac{\sqrt{3}}{2}$		
0	1	30	$\frac{\sqrt{3}}{2}$	60	$\frac{1}{2}$	90	0	120	$-\frac{1}{2}$	150	$-\frac{\sqrt{3}}{2}$		
180	-1	210	$-\frac{\sqrt{3}}{2}$	240	$-\frac{1}{2}$	270	0	300	$\frac{1}{2}$	330	$\frac{\sqrt{3}}{2}$	360	1

1.2
Range y ε [-1 ; 1]
1.4
Period = 360^0
1.5
Amplitude = 1
1.6
90^0 to the right
2
2.1

X	y	x	y	x	y	x	y	x	y
-360	0	-315	-1	-270	undefined	-225	-1		
-180	0	-135	1	-90	undefined	-45	-1		
0	0	45	1	90	undefined	135	-1		
180	0	225	1	270	undefined	315	1	360	0

2.2
Tan x is undefined at -270 ; -90 ; 90; 270
2.3
x = 90 ; x = 270; x = -90; x = -270
2.5
Range y ε (-∞; ∞)
Amplitude is undefined for Tan Graphs
2.6
Period = 180^0

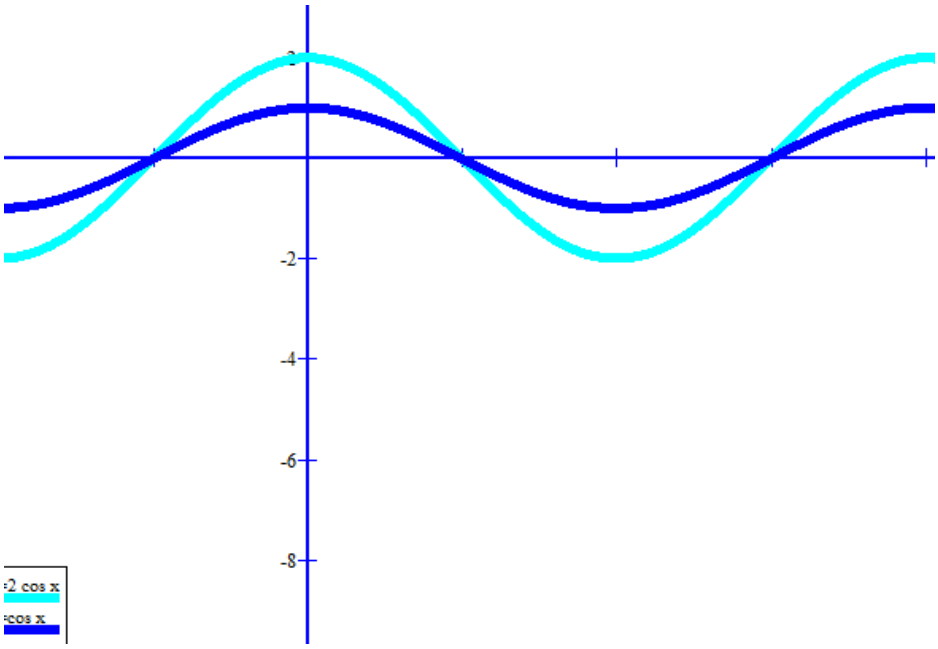
Example 3

Given y = cos x, complete the following table:

Function change	Shift
f(x) + 3	3 units up
f(x) – 2	2 units down
f(x + 30^0)	30^0 to the left
f(x - 45^0)	45^0 to the right
-f (x)	Reflect about x-axis
f (-x)	Reflect about y-axis
f(2.x)	Compress the graph horizontally by 2 units. Period is divided by 2.

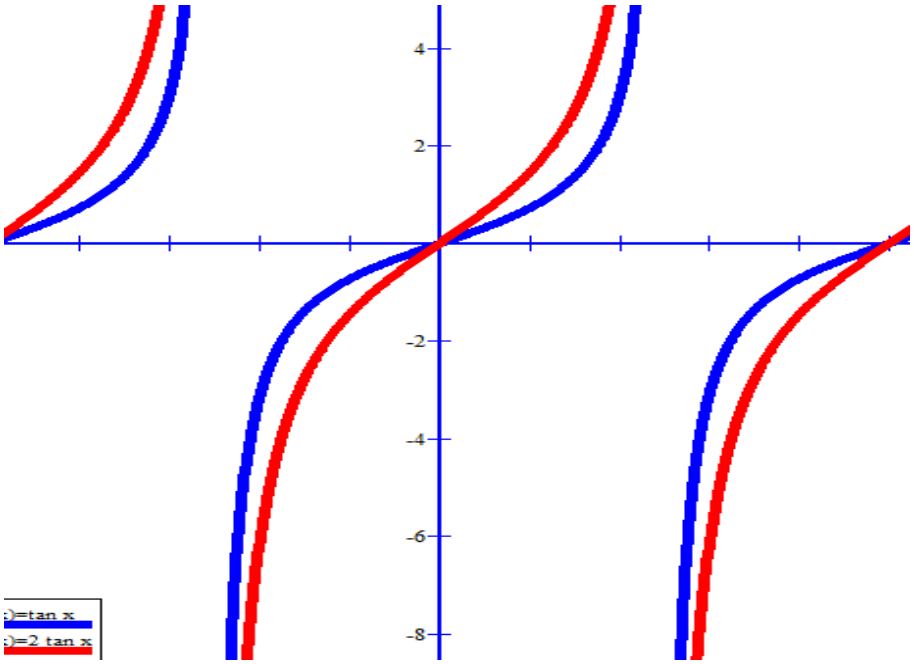
3.f(x)	Stretch the graph vertically by 3 units

Exercise 2



1.1 No Assymptotes
Period for both is 360^0
Amplitude for h is 2 and Amplitude for g is 1
Range for h: y ε [-2;2]. Range for g: y ε [-2;2].

1.2 X = -90 ; x = 90 and x = 270
1.3 -90 < x 90 or 270 < x <360
1.4 -180 < x < 0 or 180 < x < 360



2.1 Asymptotes x= -90 and x = 90
Period for both is 180^0
Amplitude is undefined for both
Range for both graphs : $y \in (-\infty; \infty)$.

2.2 x = -180 ; x = 0 and x = 180

2.3 It is the same as saying that the f(x) = g(x) + 1. In other words for what x-values is the f(x) graph 1 more than the g(x) vertically.
x = -45 and x = 135