STRONG TOWER ACADEMY

SUBJECT: FURTHER MATHEMATICS.

CLASS: SSS 1.

Teacher: Mr. Olaniyi

TOPIC: Trigonometrical Ratio of the General Angles. Graphs and Identities.

INTRODUCTION:

Sin ɵ = opposite/hypotenuse   Cos ɵ = adjacent/hypotenuse   Tan ɵ = opposite/adjacent   Tan ɵ = Sin ɵ/Cos ɵ

sin 30^0 = cos 60^0 and so on.

The x and y axes partition of a plane circle into four parts, each part is called QUADRANT which implies that are four quadrants in a circle. Below is how to determine the coordinates of a point and quadrant.

    2nd quadrant   1st quadrant

X is negative   x is positive

 Y is positive   y is *positive*

 3rd quadrant   4th quadrant

X is negative   x is positive

Y is negative   y is negative

The teacher explains to the students that theratios of certain angles that are frequently used in Trigonometrical problems which are worthwhile remembering them include the followings:

0^0 and 90^0 (0^0 is a complement of 90^0)

Cos 0^0 = 1/1 = 1Sin 0^0 = 0/1 = 0Tan 0^0 = 0/1 = 0

Cos 90^0 =0/1 = 0Sin 90^0 = 1/1 = 1Tan 90^0 = 1/0 =+∞

Sin 30^0 = 0.5   Cos 30^0 = 0.8660Tan 30^0 = 0.5774

Sin 45^0 = 0.7071Cos 45^0 = 0.7071Tan 45^0 = 1

Sin 60^0 = 0.8660Cos 60^0 = 0.5Tan 60^0 = 1.7660

ϴ	0^0	30^0	45^0	60^0	90^0	180^0	270^0	360^0
Sin ϴ	0	0.5	0.7071	0.8660	1	0	-1	0
Cos ϴ	1	0.8660	0.7071	0.5	0	-1	0	1
Tan ϴ	0	0.5774	1	1.732	infinity	0	infinity	0

You need to know and be able to apply 'Angles in quadrants' as itemized below:

90^0

2nd quadrant   1st quadrant

(- x , y)   (x , y)

180^0 0^0/ 360^0

(- x, - y)   (x, - y)

3rd quadrant   4th quadrant

270^0
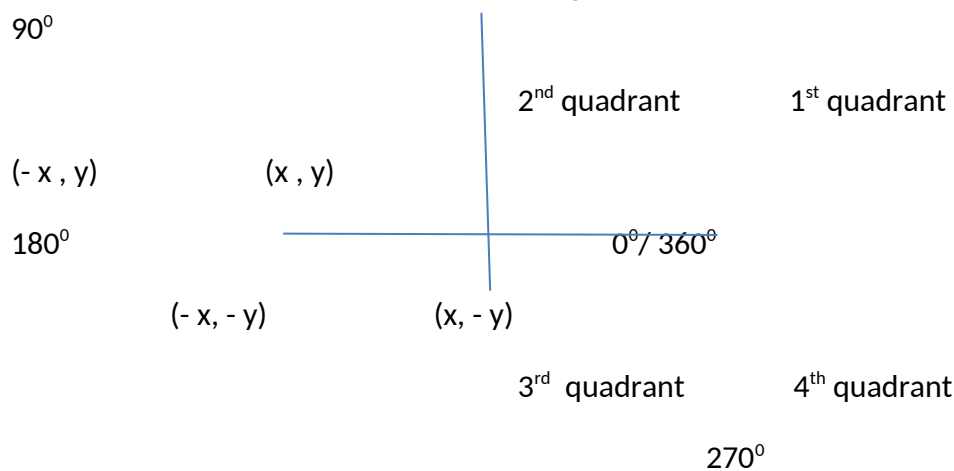
The table below may be used forangles in the four quadrants.

90^0

2nd quadrant   1st quadrant

+ sin (180 – ϴ)   + sin ϴ

-cos(180 – ϴ)   +cos ϴ

-tan (180 – ϴ)   +tan ϴ

Sine is positive   All are positive

180^{0}0^0 / 360^0

	3rd quadrant	4th quadrant

$$-\sin(ɵ - 180)$$

$$-\sin(360 - ɵ)$$
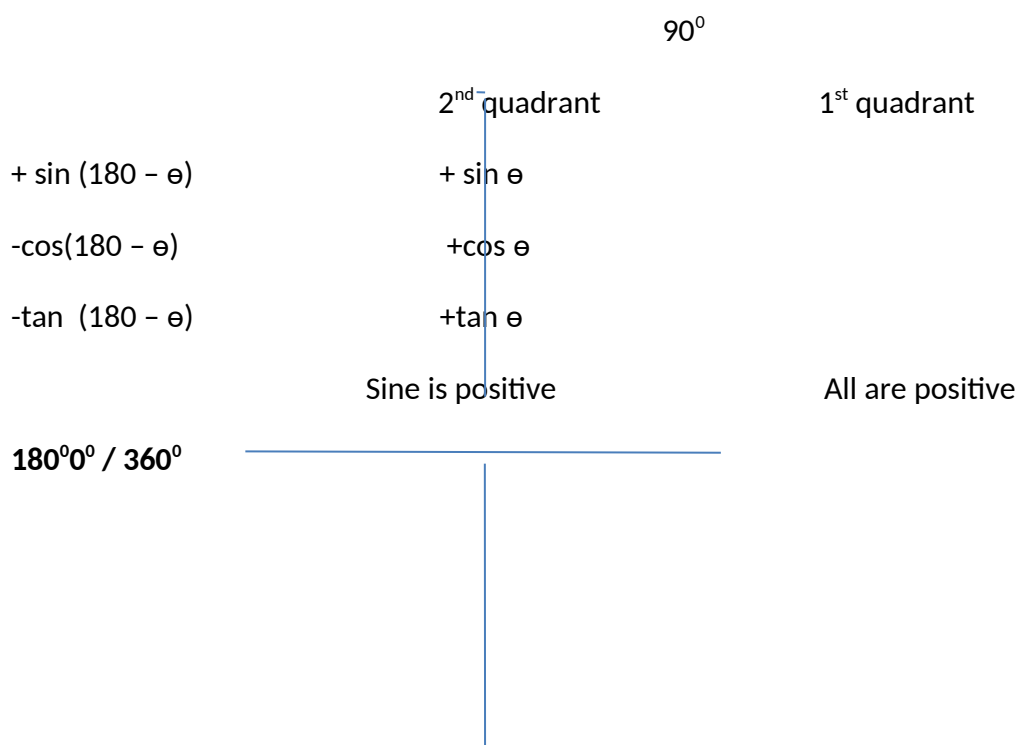
$$-\cos(ɵ - 180) \qquad +\cos(360 - ɵ)$$

$$+\tan(ɵ - 180) \qquad -\tan(360 - ɵ)$$

Tan is positive   Cosine is positive

270⁰

Step 3: The teacher makes it clear to the students that the trigonometric ratios of any negative angle can be expressedas stated below:

$$Sin(- ɵ) = \sin(360 - ɵ) = -\sin ɵ$$

$$Cos(- ɵ) = \cos(360 - ɵ) = +\cos ɵ$$

$$\tan(- ɵ) = \tan(360 - ɵ) = -\tan ɵ$$

The process of drawing graphs which they have been taught before still hold when it comes to for trigonometric graphs. (i.e. linear and quadratic functions. Similarly, for the students to read and obtain information from trigonometric graphs they need to apply the same principles they have been applying in linear and quadratic functions.

The teacher draws the graph of y = sin x;

y = cos x for $0^0\le$ x $\le 360^0$ using a scale of 2cm to 30^0 on X-axis and 2cm to 1 unit on Y-axis.

Y = tan xfor $0^0\le$ x $\le 360^0$ using a scale of 2cm to 30^0 on X-axis and 1cm to 1 unit on Y-axis.

Lead them to draw the graph of y = sin x and y = cos x on the same graph.

Usethe graph to explain basic things which the students must comprehend for the purpose of their final examinations in WASSCE and NECO respectively.

The teacher works question 2 from exercise 16.4 as an example with their active participation in New Further Mathematics Project for Senior Secondary Schools 1on page 273.

Give this question to student to solve individually and mark their works so as to identify the weak students that will need special attention and the teacher must take up the

challenge to assist them both individually and collectively to enhance students' better performance in any form of examination..

ASSIGNMENT: The teacher gives the students the following questions to solve at home.

. New Further Mathematics Project for Senior Secondary Schools 1, page 273, exercise 16.4, numbers 1 and 3.

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