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Unit 13: TRIGONOMETRY- Term 2(4 weeks)

This lesson will focus on grade 11 with a little bit of grade 10 revision where trigonometry begins, grade 12 work will be not a focus where trigonometry ends in high school level. It should be emphasized that all trigonometry work from grade 10 and 11 is examinable in grade 12.

Objectives:

1. Apply Trigonometry to solve real life problems.
2. Use of Dynamic Maths Software

TRIGONOMETRIC RATIOS, EXPRESSIONS AND EQUATIONS

(Monday 6 Sept – Sunday 12 Sept)

Section A : Preliminary – House keeping

- a) Which grade is the first introduction of trigonometry and up to which grade?
- b) CAPS page number? (33)
- c) Materials & Tools you can use to teach trigonometry.
- d) Purpose of the presence of trigonometry within the school curriculum?

Section B : Introduction and Questions for discussion on the topic

Learning outcomes:

- a) Determine trigonometric ratios of trigonometric functions.
- b) Solve problems using visual reasoning.
- c) Apply algebra and trigonometric knowledge to solve trigonometric problems.

1. Educators should be more knowledgeable in trigonometry as teachers in the past struggled to understand concepts on it, which then makes learners so understand minimum knowledge.

<https://www.mcser.org/journal/index.php/mjss/article/viewFile/2233/2219>

2. See the video from this link that introduces significant concepts with respect to real life beside mathematics, which will be promoted during the lesson.

<https://www.youtube.com/watch?v=ovLbCvq7FNA>

3. And revision part is compulsory before stating a new topic because it will help the learners to remember more about the topic.

<https://intl.siyavula.com/read/maths/grade-11/trigonometry>

4. Free application software that can be used to teach trigonometry are: GeoGebra and Trigonometria_GraficaFunzi_FREE

Additional material include.

- a) The importance of trigonometry within the school curriculum.
<https://www.ejmste.com/download/meaning-and-understanding-of-school-mathematical-concepts-by-secondary-students-the-study-of-sine-7741.pdf>



- b) The importance of software applications. EJ1098194.pdf

From the reading, discuss *Introduction*, *Computer assisted mathematics instruction*, and *Dynamic geometry software*.

Section C: Discussions

- a) Learning takes place most on guided approach rather than direct instruction and application of trigonometric skills to solve real life problems.
<https://iopscience.iop.org/article/10.1088/1742-6596/895/1/012027/pdf>

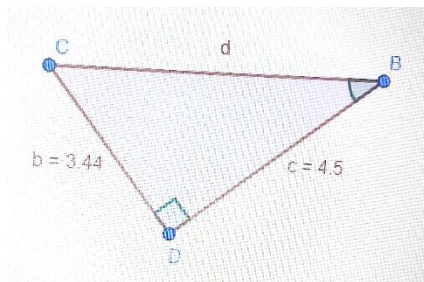
- b) Application of dynamic software in teaching promotes learning outcomes per each topic that requires visualization.



pre-service-math-teachers-opinions-about-dynamic-geometry-softwares-and-their-expectations-from-them.pdf

- c) Debate in revision from Siyavula <https://intl.siyavula.com/read/maths/grade-11/trigonometry>, and test the knowledge from the first question below.

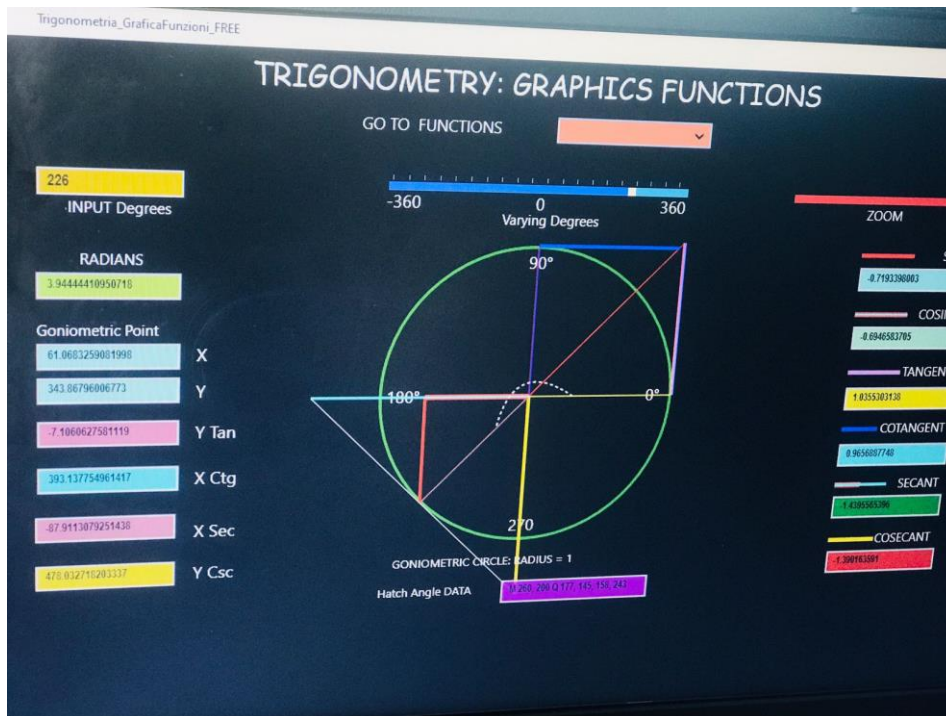
1. Study the following diagram and answer the following question:



Predict the kind of this triangle? Justify your answer.

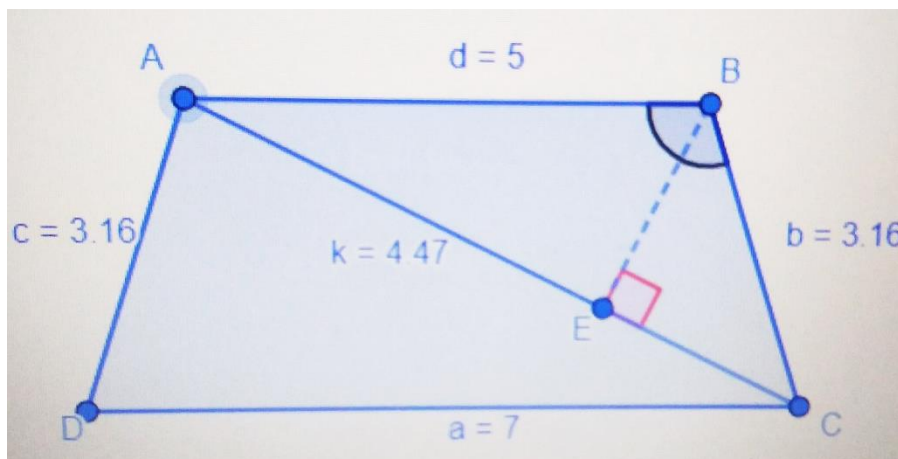
2. Determine $\sin B$, $\cos B$, and $\tan B$

3. Interact with the following picture created by Trigonometria_GraficaFunzi_FREE and answer the following question.



Simulate the above picture by changing the angle starting from 25° , 105° , 280° , up to 215° , and hence criticize what you see.

4. ABCD is an isosceles trapezium with $AB = 5$ cm, $CD = 7$ cm, $BC = AD = 3.16$ cm. Point E on diagonal AC divides the diagonal such that $AE = 4.47$ cm. Given that $\widehat{BEC} = 90^\circ$. After you have interacted with the diagram below, categorize all right-angled triangles.



5. Calculated the angle \widehat{BEA}
6. Hence calculate the lengths BE and CE
7. Determine the sizes of \widehat{BEC} and \widehat{ABE} respectively
8. Hence calculate the \widehat{ABC}
9. Build an isosceles trapezium using GeoGebra with $AB = 3$ cm, $CD = 5$ cm, $BC = AD = 3.16$
10. Compare 3 and 7 above

11. Calculate the size \widehat{BC}
12. Use any GeoGebra tool to illustrate without calculation that $\widehat{BEA} = 90^\circ$
13. Simplify the following

(a)
$$\frac{\tan(180^\circ - x)\cos(360^\circ - x) + \cos(90^\circ + x)}{\cos(90^\circ - x)\sin(90^\circ + x)}$$

(b)
$$\frac{2\sin(180^\circ - x)\cos(360^\circ - x)}{\cos(90^\circ - x)\cos(180^\circ + x)}$$

(c)
$$\frac{\cos 120^\circ \tan 225^\circ \sin 270^\circ}{\sin(-60^\circ)\cos(480^\circ)}$$

14. Determine the general solution of the following

(a) $\cos 2x = -0,174$ for $x \in [-180, 180]$

(b) $\sin(3x + 50) + \cos(2x - 10) = 0$, determine x if $x \in [-180, 180]$

(c) $2\sin x \cos x - 4\cos x = \sin x - 2$

15. If $\tan 38^\circ = k$, draw a diagram to write the following in terms of k

- a) $\tan 142^\circ$
 b) $\cos(-38^\circ)$
 c) $\sin 52^\circ$

16. Prove that:
$$\frac{1 - \sin\theta}{\cos\theta} = \frac{\cos\theta}{1 + \sin\theta}$$

17. Reduce $\frac{\sin\theta}{\tan\theta}$ to one trigonometric ratio

18. Determine the period of $\sin\theta$

19. Determine the period of $\cos\theta$

20. Write down the period of $\tan\theta$

Appendix

Review comments 1

This is good but you can still improve:

- Pls provide the reader with further details (which grade)- you may specify or provide reasons why you won't in response to :
 - Which grade is the first introduction of trigonometry and up to which?
- Also, Pls provide the reader with further details- thus materials - the resource or link
 - CAPS page number?
- Also, Pls provide the reader with further details- here materials - the resource or link
 - Materials & Tools you can use to teach trigonometry.

4. Pls, list a few and provide resource or link to that effect

d) Purpose of the presence of trigonometry within the school curriculum?

Under Section C : Discussions

Define the following:

The question is:

1. Why do you want to teach the audience "definitions"- rather familiarize yourself with the revised blooms taxonomy, and use key words starting from the third cognitive level onwards. Once you do that you will be addressing higher order thinking capacity.
2. Define and explain etc are lower order thinking capacity... Start with those in section B.
3. Under section C too, I do not see any Reading materials or resource for each of what you wish to teach .
I do not also see any effort towards specific research articles addressing your initial 2 outcomes. So also provide at least two research papers addressing those outcomes listed in section A.
4. Under section C too, provide besides Geogebra, other digital technologies for your outcomes.