



PORTFOLIO OF EVIDENCES

EXTRAORDINARY 2° OPPORTUNITY

MANAGEMENT OF FORM AND SPACES

Student name: _____

Group: _____

Student ID: _____ Date: _____

Teacher: _____

The present portfolio is part of 50% of your grade. This value will be obtained as long as it meets the following requirements:

1. Write your complete identification data.
2. The portfolio must be delivered person as a requirement the day of the exam.

FOLLOW THE INSTRUCTIONS PROVIDED BY YOUR TEACHER FOR THE COMPLETION OF THIS PORTFOLIO

!!!WARNING!!!

Plagiarisms and trade of academic material contained in this portfolio will be punished under the terms of the University Legislation.



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Purpose of the course:

The purpose of this LU, located in the second semester of general baccalaureate and technical baccalaureate, is for the student to be able to apply the elements of plane geometry and trigonometry in the modeling and problem solving of the real environment. This is relevant for the student to strengthen their spatial thinking, allowing them to construct and manipulate mental representations of objects in space, analyze their relationships, transformations and various representations, thus strengthening their ability to interpret and address situations related to the physical environment.

This LU is directly related to the Development of Algebraic Thought and subsequently to Functions and Relationships.

Management of Forms and Spaces contributes to the development of the general competencies of the UANL, by ensuring that the student: resolves personal and social conflicts according to specific techniques in the academic field and their profession for adequate decision-making (14) and develops inter, multi and transdisciplinary academic and professional proposals according to the best global practices to promote and consolidate collaborative work (7). In addition to the above, generic competencies 7 (7.2) and 8 (8.1) and disciplinary competencies 3, 4, 6 and 8 in the field of Mathematics are encouraged.

Stage 1: Angles and Triangles

- Select the postulates and theorems of the flat geometry for mathematical problem solving.

Stage 2: Polygon Properties

- Analyze the properties of polygons, quadrilaterals and circumference.

Stage 3: Rectangular Triangles

- Apply the trigonometric ratios of a right triangle to problem solving in different contexts.

Stage 4: Triangles Oblicuangles

- Calculates the value of trigonometric functions for angles of any measurement and solves everyday situations involving oblique triangles.

General Guidelines

- The activities of the portfolio of evidence must be delivered on time and in compliance with the guidelines specified by the teacher.
- In the event of plagiarism and/or malpractices in the portfolio of activities, the student must assume responsibility for their acts.

Course Policies and Guidelines



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The student and their guardian must read and sign the policies and guidelines:

- Portfolio work is required.
- Problems must have correct, clear, understandable and complete procedure. This must be done with a pencil.
- The use of Apps for the solution of portfolio problems will not be allowed.
- The use of the calculator is mandatory. (cell phone use is not allowed).
- The activities must be delivered in a timely manner, as requested by the teacher.
- For the student to obtain the 50 points in the portfolio, it must be answered 100% correctly, each problem answered incorrectly or unanswered will reduce points.
- Portfolio **NO** will be accepted out of time, if the student must reschedule their exam, the portfolio must not be delivered outside the date established by the teacher.
- Each problem must have its correct and clear procedure. If only the answer, it will be considered incomplete.
- The guidelines must be signed by the student and their tutor. If they are not signed, the teacher will not be able to review the student's activities, as this is a requirement.

Student Name & Signature

Tutor Name and Signature

STAGE 1: ANGLES AND TRIANGLES

Dimension 2: Understanding



It is time to give rise to new knowledge and relate it to what you already have; as a first step towards understanding the contents, read the concepts that refer to angles and triangles.

1.- Converts the following sexagesimal grades into Radians. ($\pi = 180^\circ$)

| | |
|------------|-------------|
| 15° | 200° |
|------------|-------------|

2.- Convert the following sexagesimal grades to Radians. ($\pi = 180^\circ$)

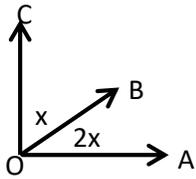
| | |
|------------------|--------------------|
| $\frac{\pi}{12}$ | $\frac{11\pi}{18}$ |
|------------------|--------------------|

Dimension 3: Analysis

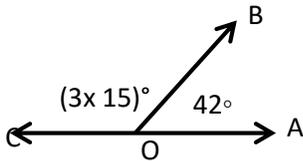
In this dimension you identify, distinguish and select the appropriate processes that lead you to determine the measurements of the angles and triangles, and in this way you analyze in greater depth what you have learned.

3.- Find what is asked of you in each of the following cases.

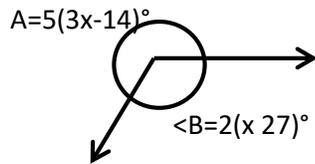
| |
|----------------------------------------------------------------------------------------------------------------------------|
| a) Two complementary angles are A and B, where $A = 4(x - 1)^\circ$, $B = 7(x - 2)^\circ$. Find the A angle measurement. |
| b) An angle and its complement are in a 3:2 ratio. Find the measure of the smallest angle. |
| c) The following figure is the right AOC angle. How tall is the AOB angle? |



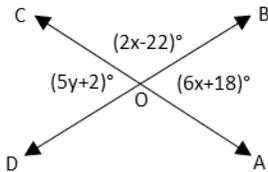
d) Find the value of "x".



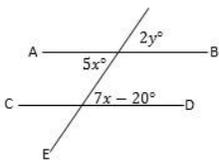
e) Find the measure of $\angle B$ in the following figure.



f) Determine the value of the "y" in the following figure:



g) In the following year, find the value of "y"

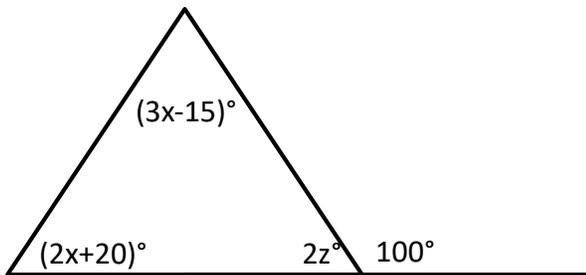


4.- In the following triangles answer what is indicated to you.

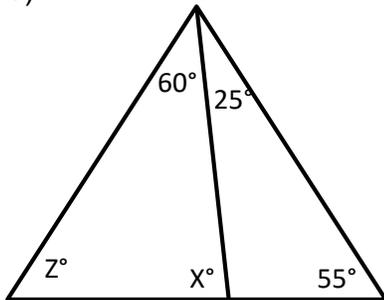
a) The angles of a triangle are in the ratio of 2:3:5. Find the measure of these angles.

b) Let A, B and C be the interior angles of a triangle, where $A = (2x + 35)^\circ$, $B = (4x - 10)^\circ$ and $C = (3x - 7)^\circ$. Determine the measurement of angle A.

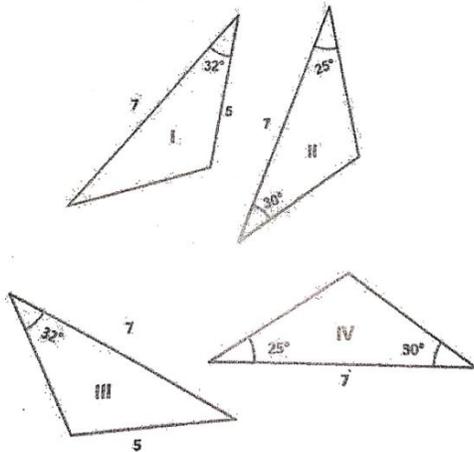
c) Determine the value of "x"



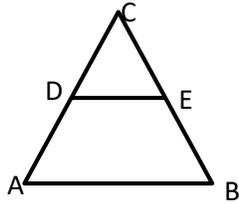
d) Determines the value of "x"



e) According to the triangles shown below, which are congruent?



f) Applying triangle similarity, determine the value of “x”



$DE \parallel AB$
 $AD = 35$
 $DC = 28$
 $DE = 2x + 8$
 $AB = 7x - 2$

CHECKLIST
SELF-EVALUATION
PERFORMANCE EVALUATION
STAGE 1

| Performance Indicator | YES | NO | OBSERVATIONS |
|----------------------------------------------------------------------------------------------------------------------------|-----|----|--------------|
| Correctly differentiated angle measurement systems. | | | |
| Correctly identified angles as measured. | | | |
| Adequately distinguished the property or theorem of the parallel lines to be used according to the context of the problem. | | | |
| Properly distinguished the properties of angles based on their sum value and position. | | | |
| Correctly identified the property of the triangles to use according to the context of the problem. | | | |
| Correctly identified congruent triangles. | | | |
| Correctly identified similar triangles. | | | |
| Wrote the procedures needed to arrive at the solution. | | | |

STAGE 2: POLYGON PROPERTIES



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Dimension 2: Understanding

In your textbook, read about polygon classification, its elements and properties, perimeter and area formulas, and circle and circumference concepts. Based on what you have learned, you will work on completing the activity.

1.- Calculate in the following regular polygons, the measurement of each inner angle, the measurement of each outer angle, the number of diagonals that can be plotted and the sum of the inner angles.

a) Decagon

b) Endecagon

2.- Determine what it tells you in each example.

a) What is the name of the regular polygon whose sum of interior angles is 1800° ?

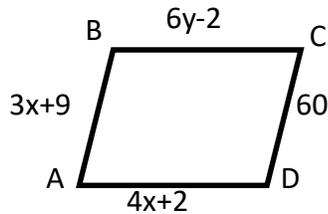
b) What is the regular polygon on which 27 diagonals can be drawn?

Dimension 3: Analysis

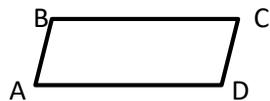
The activity of this dimension consists of a series of problems involving the properties of quadrilaterals, and those of angles associated with circumference. It is important that you write down all the procedures so that the feedback allows you to see your successes and mistakes more easily.

3.- Determine what is indicated in each Quadrilateral.

a) If ABCD is a parallelogram, find the value of "y".



b) If ABCD is a parallelogram, find "x" and "z".

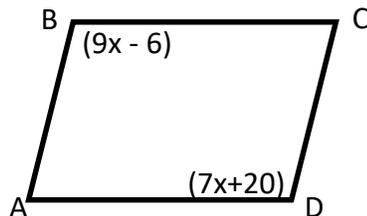


$$\angle A = (2x + 40)^\circ$$

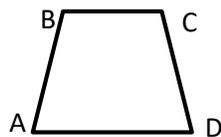
$$\angle B = 110^\circ$$

$$\angle C = 2z^\circ$$

c) If ABCD is a parallelogram, find the measure of angle A.



d) If ABCD is a trapezoid, find "x" and "z".



$$\angle B = 120^\circ$$

$$\angle A = 3x^\circ$$

$$\angle C = (4z + 30)^\circ$$

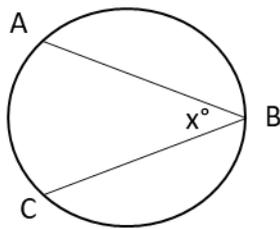
$$\angle D = 2z^\circ$$

e) If ABCD is a trapezoid, find the value of "x" and "z"



4.- In the following circumferences, determine what is requested of you

a) If $AC=62^\circ$ and B is a point belonging to the circumference, calculate "x"



**CHECKLIST
SELF-EVALUATION
PERFORMANCE EVALUATION**

STAGE 2

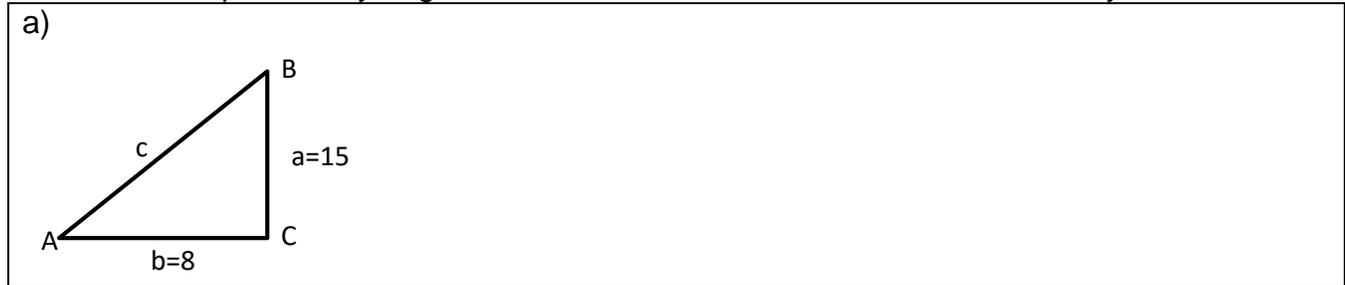
| Performance Indicator | YES | NO | OBSERVATIONS |
|--------------------------------------------------------------------------------------------------------------------------------------------|-----|----|--------------|
| Properly distinguished the property or theorem from regular polygons. | | | |
| Correctly identified the property of the parallelograms to use based on the context of the problem. | | | |
| Adequately distinguished the properties of parallelograms according to their diagonals to be used according to the context of the problem. | | | |
| Identified the enrolled angle. | | | |
| Wrote the procedures needed to arrive at the solution. | | | |

STAGE 3: RIGHT TRIANGLES

Dimension 2: Understanding

In your textbook read stage 3, in the topics; right triangle and trigonometric ratio. And so that you understand better, with the help of your proposals find the solution to the problematic situations that arise. Please answer the following activity.

1.- With the help of the Pythagorean theorem, find the side that is indicated to you.



2.- Complete the tables of the following trigonometric functions.

$$\text{Csc}\theta = \frac{1}{\text{Sen}\theta} \quad \text{Sec}\theta = \frac{1}{\text{Cos}\theta} \quad \text{Cot}\theta = \frac{1}{\text{Tan}\theta}$$

| Angle | Sine | Cosine | Tangent | Cosecant | Secant | Cotangent |
|------------------|------|--------|---------|----------|--------|-----------|
| a) 25°16'46'' | | | | | | |
| b) 63° 45'13" | | | | | | |

3.- For each of the following trigonometric functions, be At an acute angle. Find the acute angle value. Find the value of A. Write the appropriate letter in the parentheses.



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| | | |
|-----------------|-----|--------|
| Tan A=1 | () | |
| Cos A=0.81915 | () | a) 35° |
| Sen A=0.62932 | () | b) 48° |
| Tan A=1.11063 | () | c) 45° |
| Cos A=0.55919 | () | d) 56° |
| Sen A=0.4067366 | () | e) 24° |
| | | f) 39° |

4.- Given the value of the trigonometric ratio of some acute angle, determine the value of the trigonometric ratio indicated to you.

a) Given the value of the trigonometric ratio $\text{Cos}\theta = \frac{12}{13}$ of some acute angle \square , determines the value of the missing trigonometric ratios.

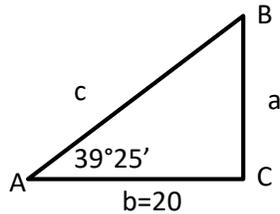
Dimension 3: Analysis

He pays attention, and also works to propose solution processes that help achieve joint learning. The activity in this dimension consists of a series of problems involving the resolution of right

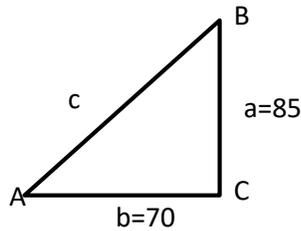
triangles. It is important that you write down all the procedures so that, in the event of feedback, it allows you to see your successes or mistakes in a simpler way.

5.- For each of the following right triangles, calculate what you are asked to do.

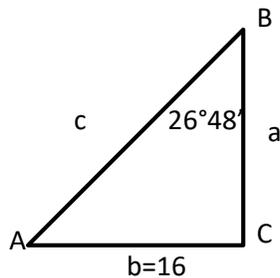
a) Determines the value of the "a" side in the next right triangle.



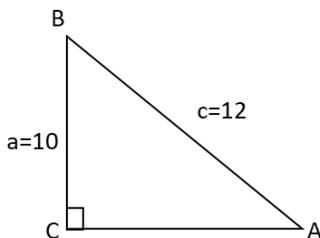
b) Determine the value of the angle "A" next right triangle.



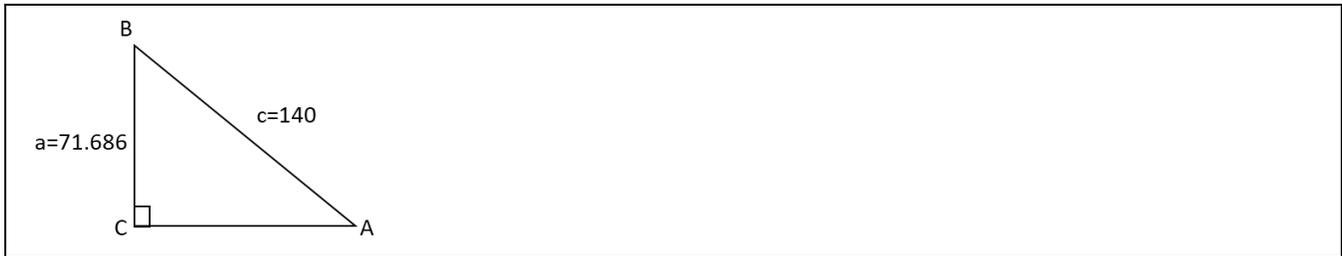
c) Determine the value of side "c" in the following right triangle.



d) Determine the value of angle "B" in the following right triangle.



e) Determine the value of angle "B" in the following right triangle.



Dimension 4: Application

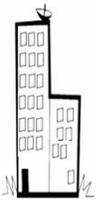
It's time to apply everything you've learned in the stage. Find a solution to the following activity.

6.- Resolve the following application problems.

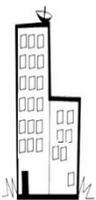
a) A 20m-tall tree casts a 28m-long shadow. Find the angle of the sun's elevation.



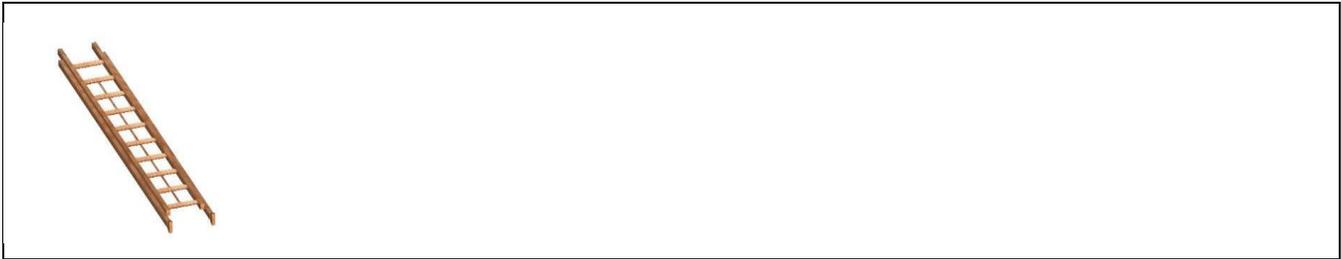
b) When the sun is 25° above the horizon, what is the length of a shadow cast by a 15m high building?



c) A building projects a shadow of 92.33mts when the sun's elevation angle is 18° . Calculate its height.



d) A 4m staircase is supported against the wall of a building, so that its lower end is 1.4m from the base of the building. Determine the angle the ladder forms with the floor.



**LISTA DE COTEJO
AUTOEVALUACIÓN
EVALUACION DE DESEMPEÑO**

ETAPA 3

| Indicador de desempeño | SI | NO | OBSERVACIONES |
|---------------------------------------------------------------------------------------------------------------------|----|----|---------------|
| Se aplicar la fórmula del teorema de Pitágoras. | | | |
| Diferencio acertadamente cada una de las razones trigonométricas para un ángulo agudo de un triángulo rectángulo. | | | |
| Calculo acertadamente con la calculadora, el valor de una función trigonométrica si conozco la magnitud del ángulo. | | | |
| Calculo correctamente la magnitud del ángulo agudo si conozco el valor de una función trigonométrica. | | | |
| Dibujó acertadamente el triángulo rectángulo si lo solicita el problema. | | | |
| Identifico correctamente la función trigonométrica a usar según lo que pida el problema. | | | |
| Uso correctamente la calculadora. | | | |
| Despejo correctamente el cateto o el ángulo solicitado en el problema. | | | |
| Presento orden y coherencia en los procedimientos. | | | |
| Puntos obtenidos por el alumno en esta etapa | | | |

STAGE 4: OBLIQUE TRIANGLES

Dimension 2: Understanding

Read through stage 4 of your textbook to understand the new content;

1.- Answer what is indicated:

a) Which of the following angles is a coterminal angle at the angle, of 38° ?

| | | | | |
|----------------|----------------|----------------|----------------|----------------|
| a) 146° | b) 236° | c) 398° | d) 416° | e) 156° |
|----------------|----------------|----------------|----------------|----------------|

b) Which of the following angles is an angle **co-terminal** to the angle, of 82° ?

| | | | | |
|----------------|----------------|----------------|----------------|----------------|
| a) 433° | b) 442° | c) 343° | d) 163° | e) 107° |
|----------------|----------------|----------------|----------------|----------------|

c) Which of the following angles is the **reference angle** for 197° ?

| | | | | |
|---------------|---------------|----------------|---------------|----------------|
| a) 60° | b) 17° | c) 150° | d) 45° | e) 420° |
|---------------|---------------|----------------|---------------|----------------|

d) Which of the following angles is the **reference angle** for 325° ?

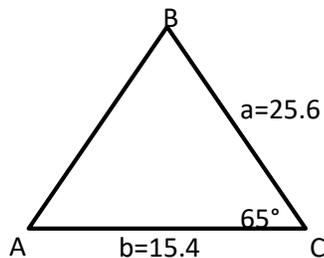
| | | | | |
|---------------|---------------|----------------|---------------|----------------|
| a) 35° | b) 45° | c) 150° | d) 60° | e) 420° |
|---------------|---------------|----------------|---------------|----------------|

Dimension 3: Analysis

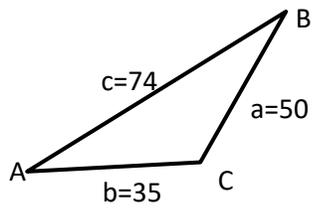
This activity consists of a series of problems involving the resolution of oblique triangles. It is very important that you write down all your procedures so that the feedback allows you to see your successes or mistakes in a simpler way.

1.- Determine what is indicated for each problem.

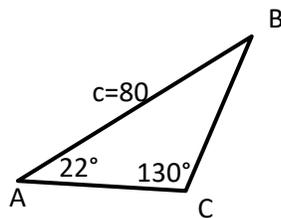
a) From the ABC triangle, determine the value of the “c” side



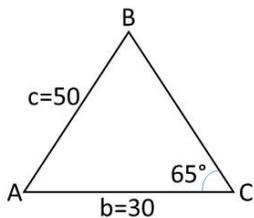
b) Given the ABC triangle, and knowing its three sides, determine the angle “C”



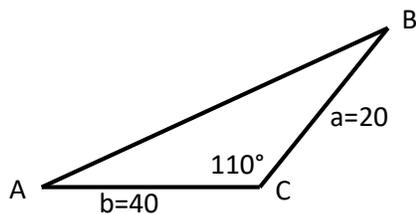
c) In the ABC triangle, determine the value on the "a" side



d) In the oblique triangle ABC, determine the angle "B"



e) Determine the area of the next triangle oblicuangle.

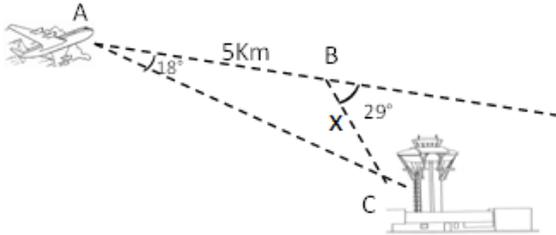


Dimension 4: Application

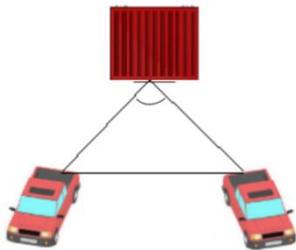
The following activity consists of the following application problems. Write all procedures in a consistent and orderly manner and clearly identify the answers you have obtained.

1.- Resolve the following application problems.

a) The pilot of an aircraft notices that the airport at which he has to land is 18° away. After advancing 5 km in the same direction, he looks at the radar again and now sees that it is at 29° . How far is the pilot from the airport?



b) Two pickup trucks drag a very heavy load on a horizontal platform. The separation between both trucks is 12 meters and the length of the ropes with which they hold the load are 9 and 15 meters, respectively. Note: trucks and cargo are not aligned.



**CHECKLIST
SELF-EVALUATION
PERFORMANCE EVALUATION**



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| STAGE 4 | | | |
|-----------------------------------------------------------------------------------|------------|-----------|---------------------|
| Performance Indicator | YES | NO | OBSERVATIONS |
| Correctly identifies a coterminal angle from an angle in normal position. | | | |
| I correctly identify the reference angle from its normal angle. | | | |
| I determine the missing elements of an oblicuangle triangle using breast law. | | | |
| I determine the missing elements of an oblique triangle using the law of cosines. | | | |
| I correctly calculate the area of an oblique triangle. | | | |
| I present order and consistency in the procedures. | | | |

Form



| Central Angle |
|------------------------|
| $\theta = \frac{S}{r}$ |

| Polygon Areas | | |
|---------------|---------------------|------------------------------|
| Polygon | Perimeter | Area |
| Square | $P = 4l$ | $A = l^2$ |
| Rectangle | $P = 2h + 2b$ | $A = bh$ |
| Triangle | $P = a + b + c$ | $A = \frac{bh}{2}$ |
| Diamond | $P = 4l$ | $A = \frac{d_1 d_2}{2}$ |
| Trapezium | $P = a + b + c + d$ | $A = \frac{h(b_1 + b_2)}{2}$ |

| Polygons |
|------------------------------------|
| $S_{int} = 180^\circ(n - 2)$ |
| $A_i = \frac{180^\circ(n - 2)}{n}$ |
| $A_{ext} = \frac{360^\circ}{n}$ |
| $d = \frac{n(n - 3)}{2}$ |
| Donde $n = \text{lad os}$ |

Rectangular Triangles

$$c^2 = a^2 + b^2$$

$$\text{Sen}\theta = \frac{co}{h} \quad \text{Csc}\theta = \frac{h}{co}$$

$$\text{Cos}\theta = \frac{ca}{h} \quad \text{Sec}\theta = \frac{h}{ca}$$

$$\text{Tan}\theta = \frac{co}{ca} \quad \text{Cot}\theta = \frac{ca}{co}$$

Reciprocal Reasons

$$\text{Csc}\theta = \frac{1}{\text{Sen}\theta}$$

$$\text{Sec}\theta = \frac{1}{\text{Cos}\theta}$$

$$\text{Cot}\theta = \frac{1}{\text{Tan}\theta}$$

Oblique Triangles

- Law of Cosines

SIDES

$$a^2 = b^2 + c^2 - 2bc\text{Cos}A$$

$$b^2 = a^2 + c^2 - 2ac\text{Cos}B$$

$$c^2 = a^2 + b^2 - 2ab\text{Cos}C$$

ANGLES

$$A = \text{Cos}^{-1} \left(\frac{b^2 + c^2 - a^2}{2bc} \right)$$

$$B = \text{Cos}^{-1} \left(\frac{a^2 + c^2 - b^2}{2ac} \right)$$

$$C = \text{Cos}^{-1} \left(\frac{a^2 + b^2 - c^2}{2ab} \right)$$

- Law of Sines

SIDES

$$\frac{a}{\text{Sen} A} = \frac{b}{\text{Sen} B} = \frac{c}{\text{Sen} C}$$

ANGLES

$$\frac{\text{Sen} A}{a} = \frac{\text{Sen} B}{b} = \frac{\text{Sen} C}{c}$$

Triangle Areas Oblicuangles

$$A = \frac{1}{2} bc \text{Sen} A$$

$$B = \frac{1}{2} ac \text{Sen} B$$

$$C = \frac{1}{2} ab \text{Sen} C$$



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Prepared by:

Coordinator

M.E.S. Leticia Azeneth Castañeda Bermea

Approved by:

Academy of Math 1 and 2

Verified by:

Class Development and Support

Validated by:

M.E. Nancy Elvira Tenorio Garza

Academic Secretary