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Mathematics

Quarter 4 - Week 3-Module 3
Illustrates Angles of Elevation and Angles of Depression

AIRs - LM

Mathematics 9
Quarter 4 Week 3- Module 3: Illustrates Angles of Elevation and Angles of Depression
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Target

After reading and studying this lesson, you will be able to illustrate angles of elevation and angles of depression. Let's start with a pre-test to check your prior knowledge about this lesson.

In this module, you will learn to:

1. Illustrates angles of elevation and angles of depression. **(M9GE-IVd-1)**

At the end of this module, you are expected to:

- Define angles of elevation, angles of depression and line of sight.
- Illustrates angles of elevation and angles of depression in real-life situation.

Let's find out how much you already know about this module. Answer the pre-assessment in a separate sheet of paper.

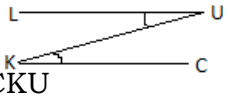
Pre-Assessment

Directions: Choose the letter of the correct answer. Write your answer on a separate sheet of paper. Take note of the items that you were not able to answer correctly and find the right answer as you go through this module.

_____ 1. What is the imaginary line that connects the eye of an observer to the object being observe?
A. angle of depression B. angle of elevation
C. angle of sight D. line of sight

_____ 2. What is the angle formed from the horizontal to the line of sight of the observer to the object below?
A. angle of depression B. angle of elevation
C. angle of sight D. line of sight

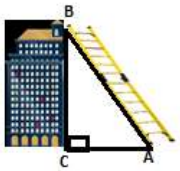
_____ 3. What is the angle formed from the horizontal to the line of sight of the observer to the object above?
A. angle of depression B. angle of elevation
C. angle of sight D. line of sight



_____ 4. Given the figure on the right, identify the angle of depression.
A. ∠CKU B. ∠LUK C. ∠LUC D. Both ∠LUK and ∠CKU

_____ 5. Using the same figure in number 4, identify the angle of elevation.
A. ∠CKU B. ∠LUK C. ∠LUC D. Both ∠LUK and ∠CKU

_____ 6. In the given diagram of a ladder leaning against a wall, which of the following angles represents the ladder's angle of elevation?
A. $\angle ACB$
B. $\angle ABC$
C. $\angle BAC$
D. $\angle ACC$



_____ 7. A straight line on the coordinate flat surface where all points on the line have the same y-coordinate. The angle and that line combine to form the angle of elevation
A. Horizontal line B. Line of sight C. Perpendicular line D. Vertical line

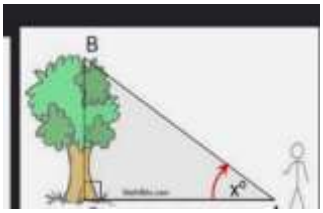
_____ 8. The line which is drawn from the eyes of the observer to the point being viewed on the object is known as_____.
A. Horizontal line B. Line of sight C. Perpendicular line D. Vertical line

_____ 9. The angle of elevation is formed in which of the following cases?
A. When looking out B. When looking down
C. When looking up D. When you have a line of sight

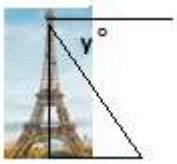
____ 10. The angle of depression is formed in which of the following cases?
A. When looking out B. When looking down
C. When looking up D. When you have a line of sight

____ 11. The angle of elevation and angle of depression represent which angle pair formed by parallel lines cut by a transversal?
A. Alternate exterior angles B. Alternate interior angles
C. Corresponding angles D. Vertical angles

____ 12. In the figure, x is represented as_____.
A. Angle of depression
B. Angle of elevation
C. Horizontal line
D. Line of sight



____ 13. In the figure, y is represented as_____.



A. Angle of depression
B. Angle of elevation
C. Horizontal line
D. Line of sight

____ 14. A 6 feet man is looking at the rooftop of 30 ft building. If the man is 12 ft away from the building, what is the angle formed from the line of sight of the man?

A. angle of depression B. angle of elevation
C. angle of sight D. line of sight

____ 15. Which of the following statement is true?

A. The angle of depression and the angle of elevation are the same angles in the same position.
B. The angle of elevation and the angle of depression are different angles, but they have the same measure.
C. The angle of depression and the angle of elevation have different measures.
D. The angle of elevation and the angle of depression are both obtuse angles.

Angles of Elevation and Angles of Depression

In this lesson, you are going to illustrate angles of elevation and angles of depression.

Suppose you are on top of a mountain looking down at a particular village, how will you directly measure the mountain's height? An airplane is flying to a certain altitude above the ground. Is it possible to instantly find the distance from the airplane to an airport using a ruler? As you have learned in the previous lesson, the trigonometric ratios will help you answer these questions. Perform the succeeding activities to apply these concepts in solving real-life problems.

Jumpstart

What are some of the important terms in this lesson? Let's find out by doing this activity.

ACTIVITY 1: HUNTING TIME!

Directions:

Study the Word Grid below. Find all the terms related to angles of elevation and angles of depression that are hidden in the grid. The words may be hidden in any direction. Write your answers below.

A	V	O	N	E	B	R	S	G	H	K	L	T	O	E
L	O	S	A	D	E	P	R	E	S	S	I	O	N	Y
T	E	E	A	R	L	G	X	Z	B	N	D	M	J	E
E	L	I	N	E	O	F	S	I	G	H	T	P	E	L
R	E	W	G	E	W	R	T	M	Y	U	I	O	V	E
N	V	S	L	D	F	G	H	A	J	K	L	M	O	V
A	A	X	E	C	V	B	N	G	M	Q	W	E	B	E
T	T	Y	U	I	H	O	R	I	Z	O	N	T	A	L
E	I	P	A	S	D	F	G	N	H	J	K	L	Z	X
C	O	V	B	N	M	K	J	A	G	F	D	S	A	W
D	N	V	B	G	R	E	V	R	E	S	B	O	G	H
I	N	T	E	R	I	O	R	Y	O	P	A	S	D	F

Answers:

_____ _____

_____ _____

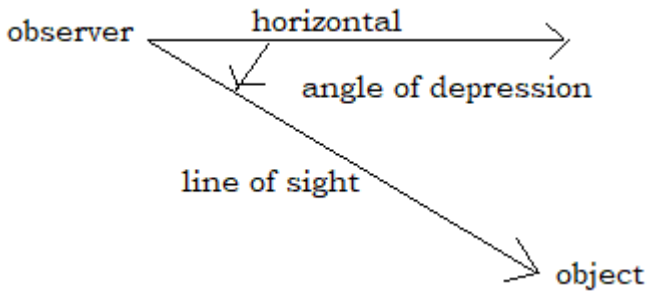
_____ _____

_____ _____

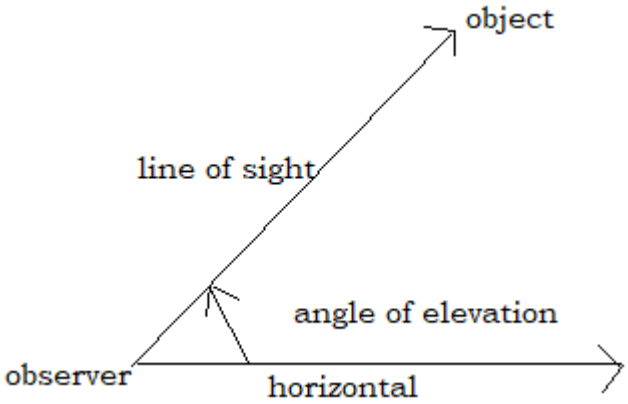
_____ _____

Discover

Line of sight is an imaginary line that connects the eye of an observer to the object being observed. If the observer is in the higher elevation than the object of observation, the acute angle measured from the eye level of the observer to his line of sight is called ***angle of depression.***

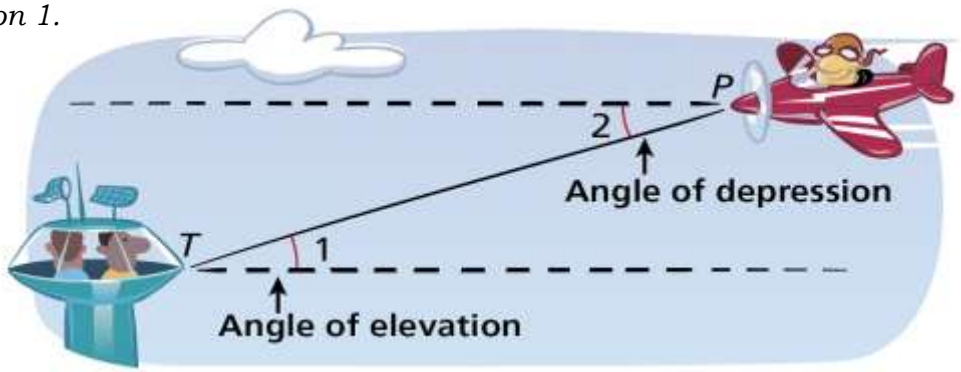


On the other hand, if the situation is reversed, that is, the observer is at the lower elevation than the object being observed, the acute angle made by the line of sight and the eye level of the observer is called ***angle of elevation.***



Since horizontal lines are parallel, ∠1 ≅ ∠2 by the Alternate Interior Angles Theorem (The **Alternate Interior Angles Theorem** states that, when two parallel lines are cut by a transversal, the resulting alternate interior angles are congruent). Therefore, the angle of elevation from one point is congruent to the angle of depression from the other point.

Illustration 1.



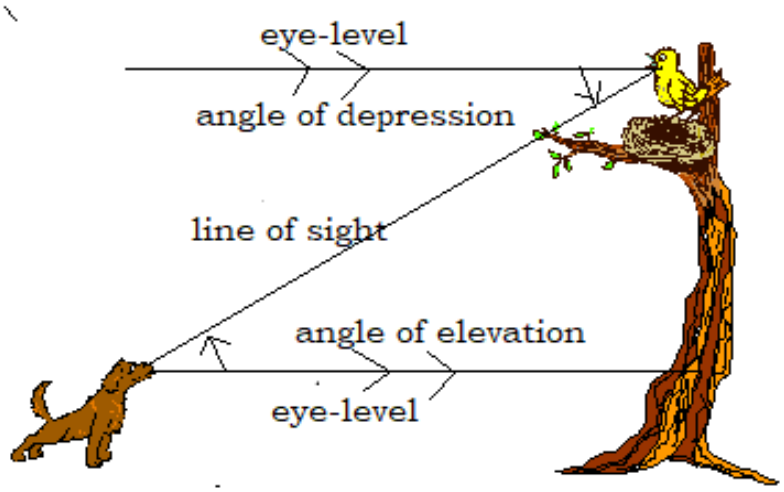


Illustration 2.

Illustrative Examples:

Classify each angle as an angle of elevation or an angle of depression.

1. ∠1

∠1 is formed by a horizontal line and a line of sight to a point below the line. It is an angle of depression.

2. ∠4

∠4 is formed by a horizontal line and a line of sight to a point above the line. It is an angle of elevation.

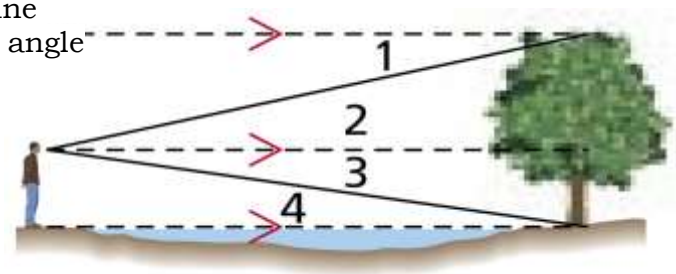


Figure 1

3. ∠1

∠1 is formed by a horizontal line and a line of sight to a point above the line. It is an angle of elevation.

4. ∠2

∠2 is formed by a horizontal line and a line of sight to a point below the line. It is an angle of depression.

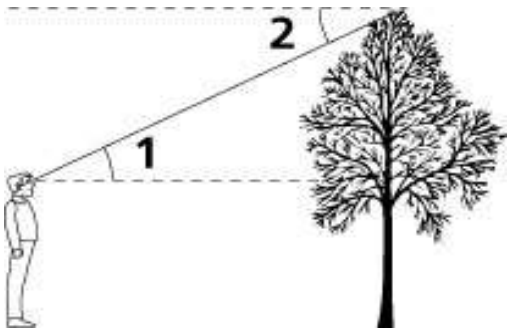


Figure 2.

Explore

Activity 2: Identify Me!

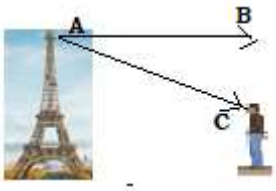
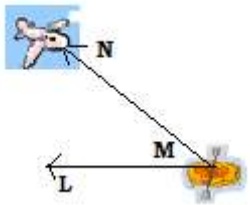
Directions:
Identify the situation if it illustrates a real scenario of angle of elevation or angle of depression.

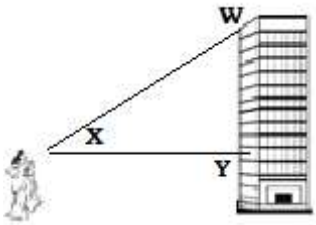
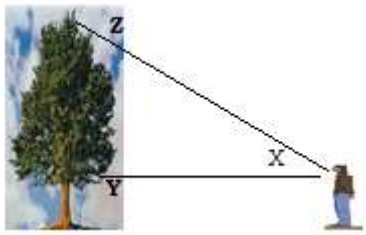
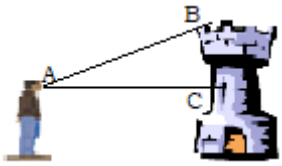
1. Jed is proposing a marriage to Chezka.
2. Angela look to Mia's eye who is smaller than her.
3. At 9:00 in the evening, Kristine went to the rooftop of their house to watch a meteor shower.
4. tying a shoe lace
5. removing of cob waves in the ceiling.

Now that you know the important ideas about the topic, let's go deeper by moving on to the next section.

Deepen

Activity 3: Where Do I Belong?
In the following figures, identify the segments that represents the line of sight, and identify the angles (if any) that represent the angle of elevation or angle of depression.

Figure	Angle of Elevation	Angle of Depression	Line of Sight
1. 			
2. 			

3.  			
4.  			
 5.			

Questions:

1. How did you identify the line of sight, angle of elevation, and angle of depression?
2. What ideas have you learned from this activity?
3. Do you think you can use these ideas in your daily life?

Gauge

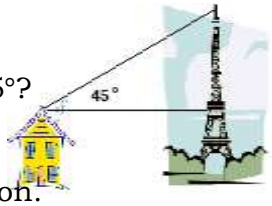
Post-Assessment

Directions: Choose the letter of the correct answer. Write your answer on a separate sheet of paper. Take note of the items that you were not able to answer correctly and find the right answer as you go through this module.

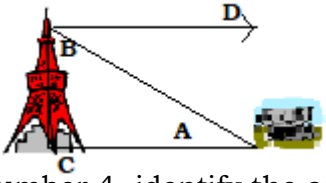
_____ 1. The line which is drawn from the eyes of the observer to the point being viewed on the object is known as_____.
A. Horizontal line B. Line of sight C. Perpendicular line D. Vertical line

_____ 2. What is the angle formed from the horizontal to the line of sight of the observer to the object below?
A. angle of depression B. angle of elevation
C. angle of sight D. line of sight

_____ 3. Based from the given illustration at the right, what is 45°?
A. angle of depression B. angle of elevation
C. angle of sight D. line of sight

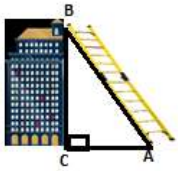


_____ 4. Given the figure at the right, identify the angle of elevation.
A. ∠BAC
B. ∠BCA
C. ∠CBA
D. ∠ACB



_____ 5. Using the same figure in number 4, identify the angle of depression.
A. ∠DBA B. ∠BAC C. ∠CBD D. ∠ACD

_____ 6. In the given diagram of a ladder leaning against a wall, which of the following angles represents the ladder's angle of elevation?
A. $\angle ACB$
B. $\angle ABC$
C. $\angle BAC$
D. $\angle ACC$



_____ 7. A straight line on the coordinate flat surface where all points on the line have the same y-coordinate. The angle and that line combine to form the angle of elevation
A. Horizontal line B. Line of sight C. Perpendicular line D. Vertical line

_____ 8. What is the imaginary line that connects the eye of an observer to the object being observe?
A. angle of depression B. angle of elevation
C. angle of sight D. line of sight

_____ 9. *Watching a meteor shower* is an example of what angle?
A. angle of depression B. angle of elevation
C. angle of sight D. line of sight

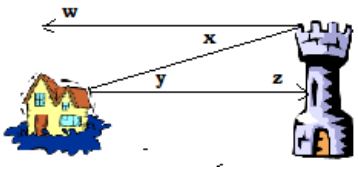
_____ 9. The angle of elevation is formed in which of the following cases?
A. When looking out B. When looking down
C. When looking up D. When you have a line of sight

____ 10. The angle of depression is formed in which of the following cases?

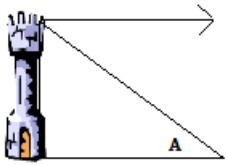
A. When looking out B. When looking down
C. When looking up D. When you have a line of sight

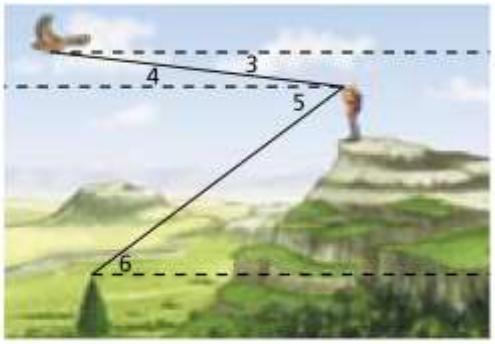
____ 11. The angle of elevation and angle of depression represent which angle pair formed by parallel lines cut by a transversal?
A. Alternate exterior angles B. Alternate interior angles
C. Corresponding angles D. Vertical angles

____ 12. In the figure, x is represented as_____.
A. Angle of depression
B. Angle of elevation
C. Horizontal line
D. Line of sight



____ 13. In the figure, ***A*** is represented as_____.
A. Angle of depression
B. Angle of elevation
C. Horizontal line
D. Line of sight





____ 14. **Refer to the figure above.** What is the alternate interior angle of ∠5?
A. ∠3 B. ∠4 C. ∠5 D. ∠6

____ 15. Which of the following statement is true?
A. The angle of depression and the angle of elevation are the same angles in the same position.
B. The angle of elevation and the angle of depression are different angles, but they have the same measure,
C. The angle of depression and the angle of elevation have different measures.
D. The angle of elevation and the angle of depression are both obtuse angles.

References

Books:

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Website:

https://www.mathsteacher.com.au/year10/ch15_trigonometry/12_elevation_depression/23elevdep.htm