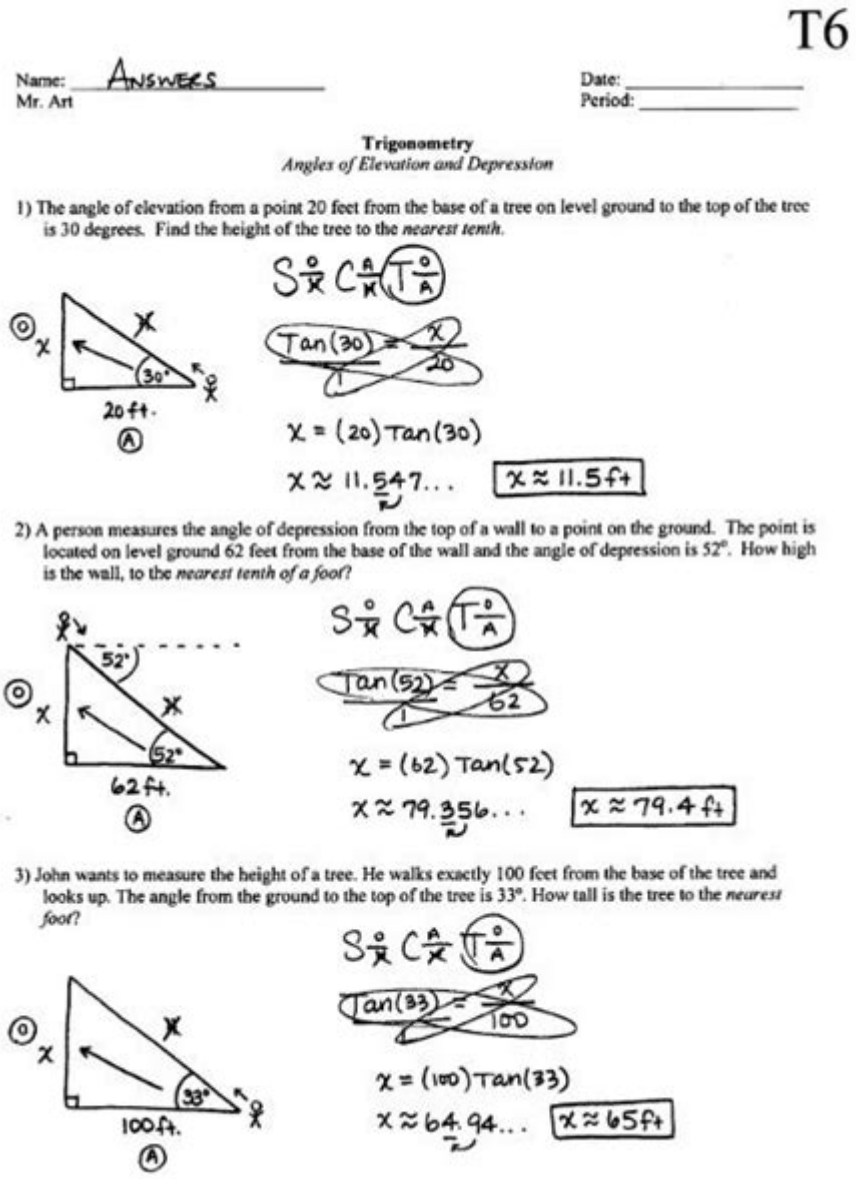
Angle Of Elevation And Depression Trig Worksheet Answers



T6

Name: ANSWERS
Mr. Art

Date: _____
Period: _____

Trigonometry
Angles of Elevation and Depression

1) The angle of elevation from a point 20 feet from the base of a tree on level ground to the top of the tree is 30 degrees. Find the height of the tree to the *nearest tenth*.

2) A person measures the angle of depression from the top of a wall to a point on the ground. The point is located on level ground 62 feet from the base of the wall and the angle of depression is 52°. How high is the wall, to the *nearest tenth of a foot*?

3) John wants to measure the height of a tree. He walks exactly 100 feet from the base of the tree and looks up. The angle from the ground to the top of the tree is 33°. How tall is the tree to the *nearest foot*?

Angle of elevation and depression trig worksheet answers are essential for students learning trigonometry, particularly in understanding how to solve problems involving right triangles and angles. The angle of elevation refers to the angle formed by a horizontal line and the line of sight to an object above the horizontal line. Conversely, the angle of depression is the angle formed by a horizontal line and the line of sight to an object below the horizontal line. This article will explore the concepts of angle of elevation and depression, their applications, and provide insight into common worksheet problems and their answers.

Understanding Angle of Elevation and Depression

To grasp the concepts of angle of elevation and depression, it is crucial to understand their definitions and applications.

Definitions

1. Angle of Elevation: This angle is measured from the horizontal line upwards to the line of sight when looking at an object that is higher than the observer's eye level. For example, if you are standing on the ground looking up at a tall building, the angle formed between your line of sight and the horizontal line is the angle of elevation.

2. Angle of Depression: Conversely, the angle of depression is measured from the horizontal line downwards to the line of sight when looking at an object that is lower than the observer's eye level. For example, if you are at the top of a tower looking down at a car on the ground, the angle formed between the horizontal line and your line of sight to the car is the angle of depression.

Visual Representation

To better visualize these concepts, consider the following diagram:

```
A (object above)
/
/ θ (angle of elevation)
/
/_____ (horizontal line)
O (observer)
```

```
O (observer)
\
\ θ (angle of depression)
\
\
A (object below)
```

In these diagrams, O represents the observer, and A represents the object being viewed. The angles θ demonstrate the angles of elevation and depression, respectively.

Applications of Angles in Real Life

Understanding angles of elevation and depression is fundamental in various fields, including:

- Architecture and Engineering: Professionals use these angles to calculate the height of buildings and structures.
- Navigation: Pilots and ship captains use these angles to determine their position relative to the ground or sea.
- Surveying: Surveyors employ these angles to measure land and plot property boundaries.

Trigonometric Functions in Angle Problems

To solve problems involving angles of elevation and depression, trigonometric functions such as sine, cosine, and tangent are vital. Here's how each function relates to angles in right triangles:

- Tangent (tan): The tangent of an angle is the ratio of the opposite side to the adjacent side. In the context of angles of elevation and depression:
- For angle of elevation:
$$
\tan(\theta) = \frac{\text{height of the object}}{\text{distance from the object}}
$$
- For angle of depression:
$$
\tan(\theta) = \frac{\text{height of the observer}}{\text{distance from the object}}
$$

- Sine (sin) and Cosine (cos): These functions can also be used, especially when dealing with scenarios that involve finding the hypotenuse or other sides of the triangle.

Common Worksheet Problems and Solutions

To illustrate how to apply these concepts, let's look at some common problems you might encounter in an angle of elevation and depression worksheet.

Problem 1: Angle of Elevation

A person is standing 50 meters away from a building. If the angle of elevation to the top of the building is 30 degrees, how tall is the building?

1. Identify the triangle: The observer, the top of the building, and the base of the building form a right triangle.
2. Use the tangent function:
$$
\tan(30^\circ) = \frac{\text{height}}{50}
$$

\]
3. Solve for height:
\[
\text{height} = 50 \cdot \tan(30^\circ) \approx 50 \cdot 0.577 = 28.85 \text{ meters}
\]

Answer: The building is approximately 28.85 meters tall.

Problem 2: Angle of Depression

A pilot is flying at an altitude of 2000 meters. If the angle of depression to a point on the ground is 45 degrees, how far is the point from the base of the altitude?

1. Identify the triangle: The altitude, the point on the ground, and the line of sight from the pilot form a right triangle.
2. Use the tangent function:
\[
\tan(45^\circ) = \frac{2000}{d}
\]
3. Solve for distance (d):
\[
d = \frac{2000}{\tan(45^\circ)} = \frac{2000}{1} = 2000 \text{ meters}
\]

Answer: The point on the ground is 2000 meters away from the base of the altitude.

Problem 3: Combined Elevation and Depression

From the top of a 100-meter tall lighthouse, a boat is observed at an angle of depression of 30 degrees. How far is the boat from the base of the lighthouse?

1. Identify the triangle: The lighthouse, the boat, and the line of sight create a right triangle.
2. Use the tangent function (remembering the observer's height):
\[
\tan(30^\circ) = \frac{100}{d}
\]
3. Solve for distance (d):
\[
d = \frac{100}{\tan(30^\circ)} \approx \frac{100}{0.577} \approx 173.21 \text{ meters}
\]

Answer: The boat is approximately 173.21 meters away from the base of the lighthouse.

Conclusion

Understanding the concepts of angle of elevation and depression is crucial for solving various real-world problems. By applying trigonometric functions and practicing with worksheet problems, students can develop a solid grasp of these concepts. Whether it's calculating heights, distances, or angles, mastering these skills is a valuable asset in mathematics and its applications in various fields. As you tackle more complex problems, the foundational knowledge of angles will serve you well in your studies and future endeavors.

Frequently Asked Questions

What is the angle of elevation?

The angle of elevation is the angle formed between the horizontal line and the line of sight when looking up at an object.

What is the angle of depression?

The angle of depression is the angle formed between the horizontal line and the line of sight when looking down at an object.

How do you calculate the angle of elevation in a right triangle?

You can calculate the angle of elevation using the tangent function: tan(angle) = opposite/adjacent.

What is a common application of angle of elevation in real life?

A common application is in determining the height of buildings or trees by measuring the distance from the observer and the angle of elevation.

What is the relationship between angle of elevation and angle of depression?

The angle of elevation from one point to an object is equal to the angle of depression from that object to the same point.

How do you find the height of an object using angle of elevation?

Use the formula: height = distance tan(angle of elevation).

Can angles of elevation and depression be used in navigation?

Yes, they are often used in navigation to determine the positions of ships and aircraft relative to the observer.

What tools can help solve problems involving angles of elevation and depression?

Tools such as a protractor for measuring angles, a calculator for trigonometric functions, and a measuring tape for distances can be helpful.

Why is it important to differentiate between angle of elevation and angle of depression?

Differentiating between the two is crucial for accurately solving problems in trigonometry and understanding the context of the measurements.

Angle Of Elevation And Depression Trig Worksheet Answers

50 mejores juegos de mesa y el Top 10 más vendidos 2025
Si eres de los míos y te encantan los juegos de mesa estás de suerte, porque este tipo de entretenimiento está en …

Top 10 de los mejores juegos de mesa en México. — DidactiJueg…
Y para que no estés buscando más, aquí te dejare una lista con el top 10 de los mejores juegos de mesa en México con …

Los 41 mejores juegos de mesa: desde 'Catán' hasta 'Gloomhave…
May 14, 2025 · Por eso, en Xataka hemos seleccionado los mejores juegos de mesa. 37 ejemplos con los que la diversión, …

Los 50 mejores juegos de mesa de la historia
En esta sección de la web hemos hecho una de las mayores selecciones de juegos de mesa del mercado, al crear una …

TOP 20 Mejores Juegos de Mesa Más Populares - Actualizado jul…
Jun 24, 2019 · En juegosdemesayrol.com queremos hablarte de los juegos de mesa más populares de la actualidad. En …

Dell Technologies Inc. (DELL) Stock Price, News, Quote & History …
Find the latest Dell Technologies Inc. (DELL) stock quote, history, news and other vital information to help you with your stock trading and investing.

DELL Stock Price | Dell Technologies Inc. Cl C Stock Quote (U.S.: …

4 days ago · DELL | Complete Dell Technologies Inc. Cl C stock news by MarketWatch. View real-time stock prices and stock quotes for a full financial overview.

Dell Technologies Inc (DELL) Stock Price & News - Google Finance
Get the latest Dell Technologies Inc (DELL) real-time quote, historical performance, charts, and other financial information to help you make more informed trading and investment decisions.

DELL: Dell Technologies Inc - Stock Price, Quote and News - CNBC
Get Dell Technologies Inc (DELL:NYSE) real-time stock quotes, news, price and financial information from CNBC.

Dell Technologies (DELL) Stock Price & Overview
4 days ago · A detailed overview of Dell Technologies Inc. (DELL) stock, including real-time price, chart, key statistics, news, and more.

Dell Stock Price Today | NYSE: DELL Live - Investing.com
View today's Dell Technologies Inc stock price and latest DELL news and analysis. Create real-time notifications to follow any changes in the live stock price.

Dell Technologies (DELL) Stock Price, News & Analysis - MarketBeat
4 days ago · Should You Buy or Sell Dell Technologies Stock? Get The Latest DELL Stock Analysis, Price Target, Dividend Info, Headlines, and Short Interest at MarketBeat.

Dell Technologies Inc. Class C Common Stock (NYSE:DELL) Stock …
Jul 18, 2025 · View live stock data, charting, and news for Dell Technologies Inc. Class C Common Stock (NYSE:DELL)

Dell Technologies (NYSE:DELL) Stock Price - Simply Wall St
Find the latest Dell Technologies Inc. (NYSE:DELL) stock price, share price history, and explore other investor’s opinions to make your investment decision.

DELL: Dell Technologies Inc Stock Price Quote - Bloomberg
4 days ago · Stock analysis for Dell Technologies Inc (DELL:New York) including stock price, stock chart, company news, key statistics, fundamentals and company profile.

Unlock your understanding of angle of elevation and depression with our comprehensive trig worksheet answers. Discover how to master these concepts effectively!

Back to Home