



**Student Name:** \_\_\_\_\_

**Class:** \_\_\_\_\_

**Due Date:** \_\_\_\_\_

## Introduction to Calculating Bearings

### What are Bearings?

Calculating bearings is a crucial skill in navigation, surveying, and geography. It involves measuring directions and angles between objects or locations.

### Types of Bearings:

- True bearings: measured from true north
- Magnetic bearings: measured from magnetic north
- Grid bearings: measured from the grid lines on a map

### Activity 1: Calculating Bearings using a Compass

Use the diagram below to calculate the bearing of the location marked X.

[Insert diagram of a compass and a map]

1. Identify the direction of the location marked X
2. Measure the angle between the direction and the magnetic needle
3. Calculate the bearing using the formula: bearing = angle + direction

### Activity 2: Identifying Types of Bearings

1. A hiker uses a compass to navigate through the wilderness. What type of bearing is the hiker using?
2. A surveyor uses a theodolite to measure the angle between two landmarks. What type of bearing is the surveyor using?
3. A pilot uses a GPS device to navigate through the air. What type of bearing is the pilot using?

### Activity 3: Calculating Bearings using Trigonometry

Use the formula:  $\text{bearing} = \arctan(\text{opposite side} / \text{adjacent side})$  to calculate the bearing of the location marked X.

[Insert diagram of a right-angled triangle]

1. Identify the opposite side and adjacent side of the triangle
2. Calculate the bearing using the formula

**Activity 4: Applying Bearings to Real-World Scenarios**

1. A ship is sailing from point A to point B. The distance between the two points is 10 km, and the angle between the two points is 45 degrees. What is the bearing of the ship?
2. A hiker is walking from point A to point B. The distance between the two points is 5 km, and the angle between the two points is 30 degrees. What is the bearing of the hiker?

### Conclusion:

Calculating bearings is an essential skill in navigation, surveying, and geography. By understanding the different types of bearings and how to calculate them, you can apply your knowledge to solve problems and make informed decisions in real-world scenarios.

### Assessment:

1. What is the definition of a bearing?
2. What is the difference between a true bearing and a magnetic bearing?
3. Calculate the bearing of a location using a compass and map.
4. Identify the type of bearing described in each scenario:
  - A pilot uses a GPS device to navigate through the air.
  - A surveyor uses a theodolite to measure the angle between two landmarks.
  - A hiker uses a compass to navigate through the wilderness.

## Extension Activity

### **Design a Navigation System:**

Design a navigation system that uses bearings to guide a ship from point A to point B. Include a map, compass, and calculations to support your design.

### Glossary:

- Bearing: a way of measuring directions and angles between objects or locations
- True bearing: measured from true north
- Magnetic bearing: measured from magnetic north
- Grid bearing: measured from the grid lines on a map
- Compass: a tool used to measure bearings
- Protractor: a tool used to measure angles
- Trigonometry: a branch of mathematics that deals with the relationships between the sides and angles of triangles

### Answers:

#### Activity 1: Calculating Bearings using a Compass

Bearing = 270 degrees

#### Activity 2: Identifying Types of Bearings

1. Magnetic bearing
2. True bearing
3. Grid bearing

#### Activity 3: Calculating Bearings using Trigonometry

Bearing = 45 degrees

#### Activity 4: Applying Bearings to Real-World Scenarios

1. Bearing = 225 degrees
2. Bearing = 210 degrees