



Grade 7- Grade 8

## Teaching Demo Materials

Preview the following materials and prepare for your demonstration. There are three questions, and you will be **randomly** assigned to present one during your interview.



Read the table below to gain a fundamental understanding of WuKong Math. Please choose appropriate methods for engagement and interaction with students.

Features	Details
Demo Presentation Time	10-15 minutes
Class Capability	28 students
Student Age Group	13-15 years old



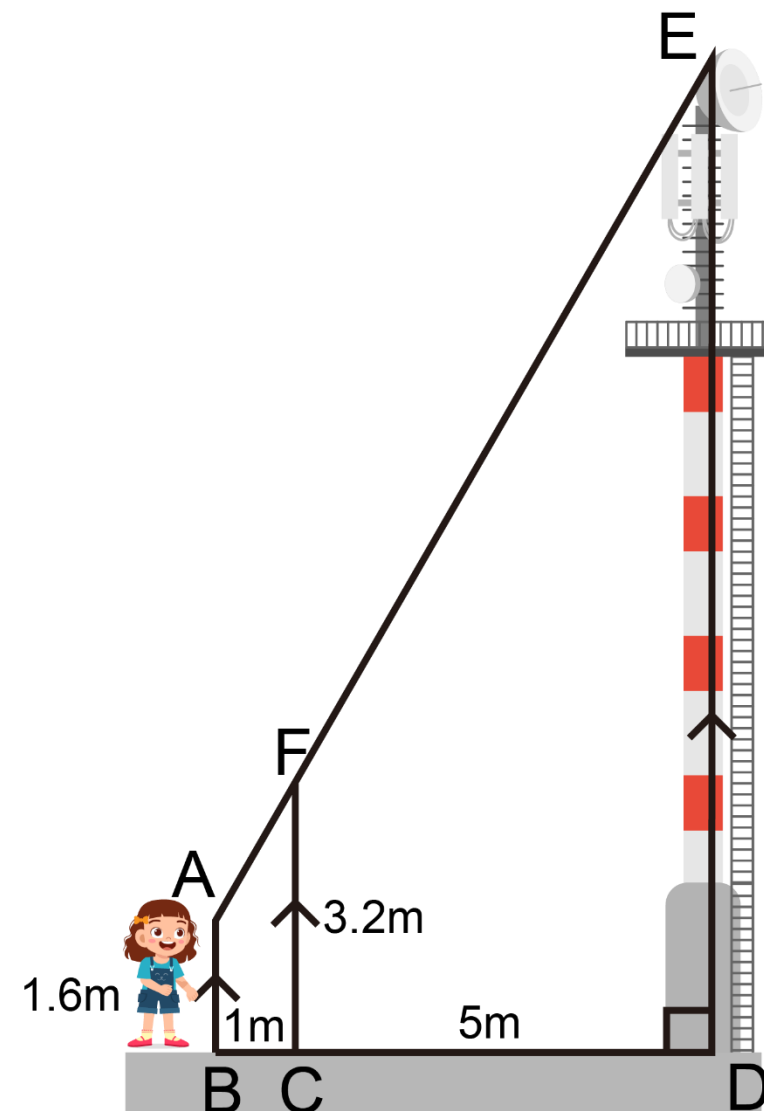
## Question A

**The Topic of The Question:** Applications of Similar Triangles.

**Learning Objective:** Be able to apply similar triangles to solve practical problems. Adding helping lines to solve practical problems.

## Question A

As shown in the figure, Lucy stands at point B and uses pole FC to measure the height of a TV tower ED (Lucy, the pole and the tower are all parallel to each other). Lucy's eye level point A is aligned with the top of the pole point F and the top of the tower point E. Points B, C, and D are also on the same line. It is given that  $AB = 1.6$  m,  $FC = 3.2$  m,  $BC = 1$  m and  $CD = 5$  m. Find the height of the TV tower.



## Inquiry question 1: How to find similar triangles?

Draw AH so that  $AH \perp ED$  and crosses FC at point G, as shown in the figure

Since  $FC \parallel ED$ ,  $\triangle AGF$  is similar to the  $\triangle AHE$ ,  $\frac{FG}{EH} = \frac{AG}{AH}$ .

## Inquiry Question 2: What is the length of EH?

The figure shows  $GC = HD = AB = 1.6$  m,  $AG = BC = 1$  m,  $GH = CD = 5$  m.

So  $FG = FC - GC = 3.2 - 1.6 = 1.6$  m,  $AH = AG + GH = 1 + 5 = 6$  m.

$$\text{So } \frac{1.6}{EH} = \frac{1}{6}$$

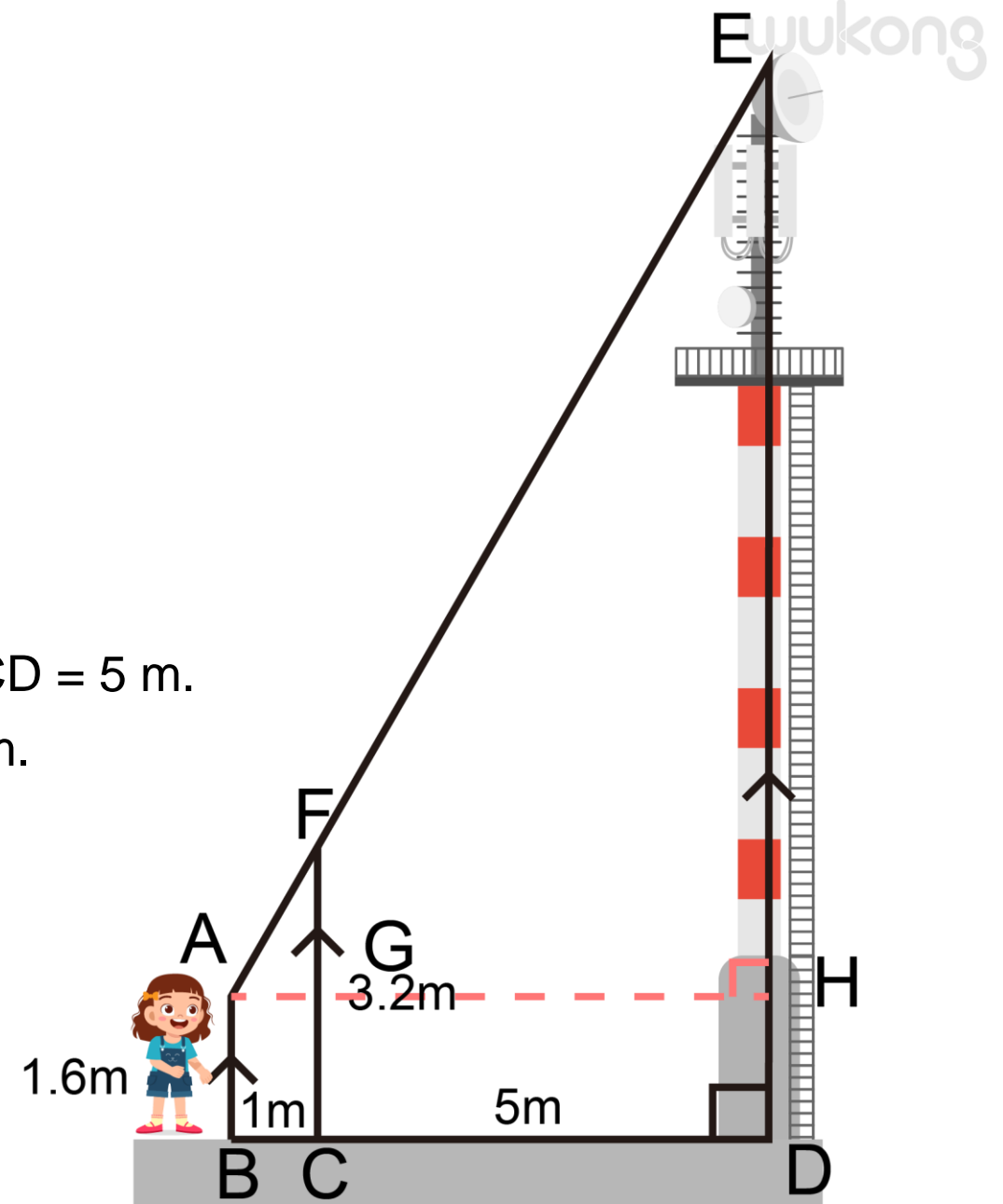
$$\text{Thus, } EH = 1.6 \times 6 = 9.6 \text{ m}$$

## Inquiry Question 3: What is the height of the TV tower?

$$ED = EH + HD = 9.6 + 1.6 = 11.2 \text{ m}$$

Note: Don't forget to add the length of HD at the end.

**Answer: 11.2 m**







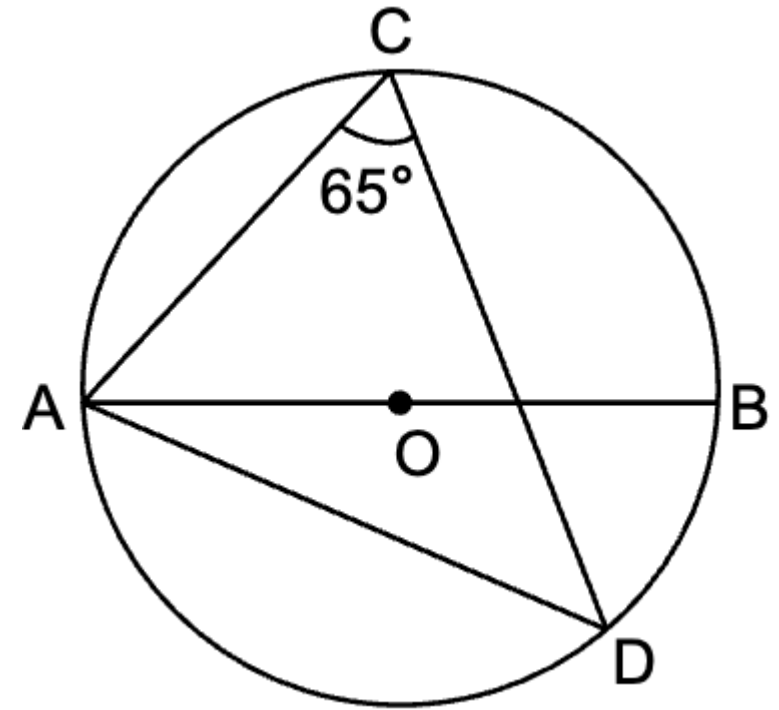
## Question B

**The Topic of The Question:** Circle - Diameter and Chord.

**Learning Objective:** Understand basic concepts and properties of circles. Master perpendicular chord bisector theorem.

## Question B

In the diagram,  $AB$  is a diameter of a circle with center  $O$ . Given that  $C$  and  $D$  are points on the circle and  $\angle ACD = 65^\circ$ , find  $\angle BAD$ .



**Inquiry question 1: What can you conclude using the diameter?**

Connect BC and Inscribed Right Triangle Theorem

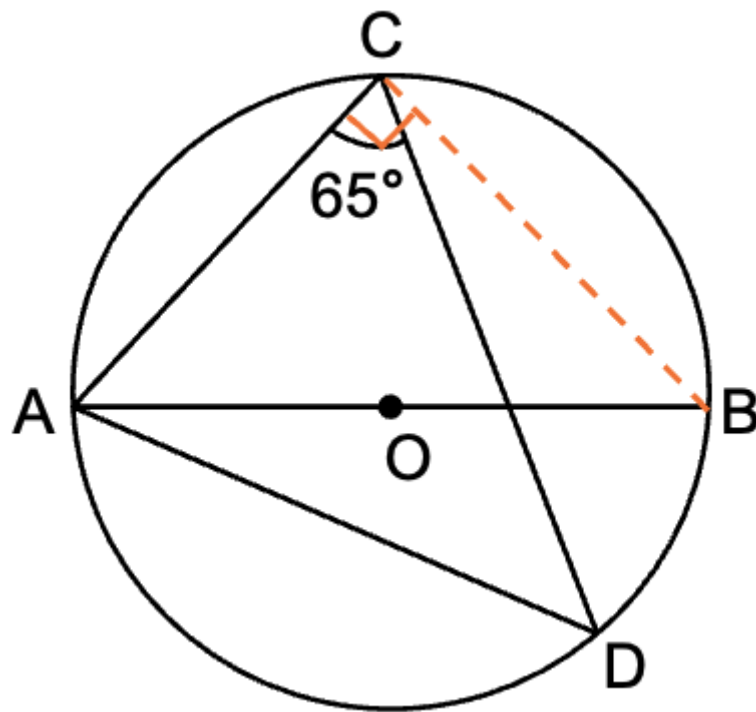
Since AB is the diameter,  $\angle ACB = 90^\circ$ .

Since  $\angle ACD = 65^\circ$ ,  $\angle BCD = 90^\circ - 65^\circ = 25^\circ$ .

**Inquiry question 2: What is the measure of  $\angle BAD$ ?**

$\angle BCD$  and  $\angle BAD$  are in the same segment BD.

So  $\angle BCD = \angle BAD = 25^\circ$ .







## Question C

**The Topic of The Question:** Permutation and Combination.

**Learning Objective:** Be able to apply permutation and combination formulas to solve complicated counting problems.

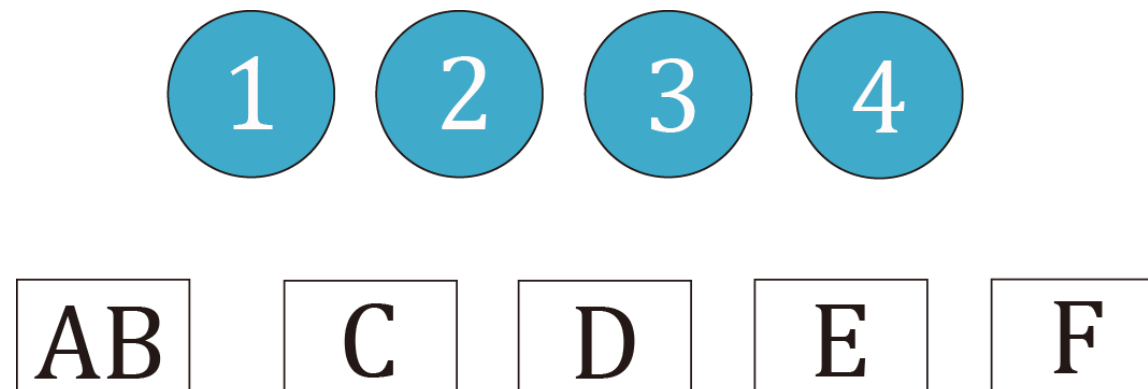
### Question C

A school assigns 6 newly recruited teachers to 4 different grades. At least one teacher is assigned to each grade, and teachers Alice and Ben must be assigned to the same grade. How many different assignment plans are there?

**Analysis:**

Suppose 6 teachers are assigned to grades 1, 2, 3, and 4. Alice and Ben must be assigned to the same grade.

Use "A" and "B" for Alice and Ben respectively. Therefore, Alice and Ben can be considered as one group. Now we have 5 groups to arrange.



**Inquiry question 1:**How many ways are there to choose 2 groups from the 5 groups randomly?

Randomly choose 2 groups from the 5 groups to form a new team. It is a combination problem.

$${}^5C_2 = \frac{5 \times 4}{2 \times 1} = 10 \text{ ways}$$

Now, 6 teachers are divided into 4 groups.

**Inquiry question 2:**How many different ways are there to distribute the 4 groups of teachers to 4 different grades?

Arrange the newly divided 4 groups into 4 grades respectively. It is a permutation problem.

$$4P_4 = 4 \times 3 \times 2 \times 1 = 24 \text{ ways}$$

**Inquiry question 3:**How many different arrangements are there in total?

In summary, there are  $10 \times 24 = 240$  ways.

**Answer: 240**

Thank You!

