Unit 15 · Trigonometry

WORKSHEET

Full marks 33

Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 33

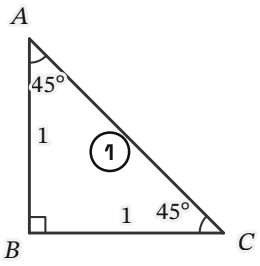
1 Key words [2.5]

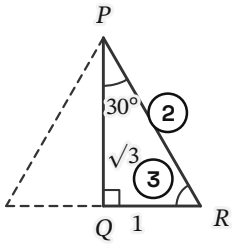
Match each word in Column A with its meaning in Column B. Write the letter in the box. One meaning in Column B is not needed. Each match carries 0.5 mark.

Column A		Column B
1. line of sight	☐	**a.** the angle between the horizontal and the line of sight to an object above the eye
2. angle of elevation	☐	**b.** the angle between the horizontal and the line of sight to an object below the eye
3. angle of depression	☐	**c.** an instrument that measures an angle of elevation or depression
4. clinometer	☐	**d.** the straight line from the eye to the object looked at
5. horizontal line	☐	**e.** the length of the shadow of an object at noon
		f. a level line through the eye, at right angles to a plumb line

2 Complete the set squares [1.5]

Write the missing side or angle in each numbered box.





1. _____ **2.** _____

3. _____

3 Multiple choice [5]

Choose the correct option for each of the following questions.

i. What is the value of tan 60°? [1]

a. $\frac{1}{\sqrt{3}}$ **b.** 1

c. $\sqrt{3}$ **d.** $\frac{\sqrt{3}}{2}$

ii. What is $\sin 30° + \cos 60°$? **[1]**

a. $\frac{1}{2}$ **b.** 1

c. $\sqrt{3}$ **d.** $\frac{1+\sqrt{3}}{2}$

iii. A tower 20 m high is seen from a point on level ground 20 m from its foot. What is the angle of elevation of its top? **[1]**

a. 30° **b.** 45°

c. 60° **d.** 90°

iv. From the top of a cliff, the angle of depression of a boat is 40°. What is the angle of elevation of the top of the cliff from the boat? **[1]**

a. 50° **b.** 40°

c. 80° **d.** 140°

v. A pole's shadow is $\sqrt{3}$ times as long as the pole. What is the angle of elevation of the sun? **[1]**

a. 30° **b.** 45°

c. 60° **d.** 75°

4 Very short answers **[3]**

Write very short answers to the following questions.

a. Write the value of $\cos 30°$. **[1]**

b. A height and the horizontal distance to it are both in a problem. Which trigonometric ratio links them? **[1]**

c. The angle of elevation of the sun is 45°. How long is the shadow of a 7 m pole? **[1]**

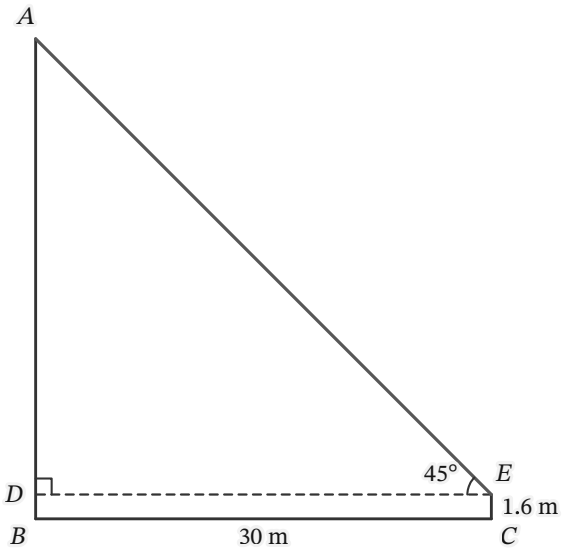
5 Short answers **[6]**

Write short answers to the following questions.

a. Ram stood 40 m from a pole. The angle of elevation of its top was 45°, and his eye was 1.5 m above the ground. He wrote: "$\tan 45° = \frac{h}{40}$, so $h = 40$ m, and the pole is $40 - 1.5 = 38.5$ m tall." Find his mistake and the pole's real height. **[2]**

b. Explain why the angle of elevation of B seen from A is always equal to the angle of depression of A seen from B. **[2]**

c. Read the figure: the eye E is 1.6 m above the ground and 30 m from the tree AB. Find the tree's height. **[2]**



6 Problems [13]

Solve. Show your working. Draw a figure for each.

a. A kite is flying on a string 100 m long. The string, taken as straight, makes 60° with the ground. How high is the kite? **[3]**

Answer: _____

b. From the top of a cliff 30 m high, the angle of depression of a boat is 30°. How far is the boat from the foot of the cliff? **[3]**

Answer: _____

c. A tree 9 m tall is broken by the wind. Its top touches the ground and the broken part makes 30° with the ground. Find the height of the part still standing, and how far the top lands from the foot of the tree. **[3]**

Answer: _____

d. The angle of elevation of the top of a tower is 30°. After walking 20 m straight towards it, the angle is 60°. Find the height of the tower. **[4]**

Answer: _____

7 Think **[2]**

Think, then answer.

As you walk towards a tower on level ground, what happens to the angle of elevation of its top? Can it ever be 90°? Explain.

8 Activity: Measure a tall thing (not marked)

Make the clinometer from the unit (a protractor, a straw, a thread and a small weight). Measure three tall things near your school. The angle of elevation is the difference between the thread's reading and 90°.

Object	Distance from its foot (m)	Thread reads	Angle of elevation	Your eye height (m)	Height (m)

Measure one of them again from a different distance. Do you get the same height?