INDIAN SCHOOL AL WADI AL KABIR

Department: Mathematics

Class X **Worksheet – Applications of Trigonometry**

29-10-2022

Questions of 1 mark each

Q.1. If a pole 6m high casts a shadow of $2\sqrt{3}$ m long on the ground, then the Sun's elevation is

A	60°	B	45°	C	30°	D	75°

Q.2. The angle of elevation of the top of a tower from a point on the ground is 45°. If the observer is 42m away from the foot of the tower, then the height of the tower is

A	63 m	B	21 m	C	84 m	D	42 m

Q.3. The ratio of the length of a rod and its shadow is 1: $\sqrt{3}$,then the angle of elevation of the sun is

A	90°	B	45°	C	30°	D	75°

Q.4. If the angle of depression of an object from a 75m high tower is 30°,then the distance of the object from the base of the tower is

A	$25\sqrt{3}$ m	B	$50\sqrt{3}$ m	C	$75\sqrt{3}$ m	D	150 m

Q.5. If the height and length of the shadow of a man are the same, then the angle of elevation of the Sun is

A	30°	B	60°	C	45°	D	15°

Q.6. The length of a string between a kite and a point on the ground is 85 m. If the string makes an angle θ with level ground such that $\tan\theta = \frac{15}{8}$, then the height of kite from the ground is

A	75 m	B	40 m	C	85 m	D	23 m

Q.7. The top of two poles of height 20 m and 14 m are connected by a wire. If the wire makes an angle of 30° with the horizontal, then the length of the wire is

A	8 m	B	12 m	C	10 m	D	6 m

Q.8. An observer, 1.5 m tall is 20.5 away from a tower 22 m high, then the angle of elevation of the top of the tower from the eye of observer is

A	30°	B	60°	C	90°	D	45°

Q.9. A tree is broken by the wind. The top struck the ground at an angle of 30° and at distance of 10 m from its root. The whole height of the tree is

A	$10\sqrt{3}$ m	B	$3\sqrt{10}$ m	C	$5\sqrt{3}$ m	D	$20\sqrt{3}$ m

Q.10. **DIRECTION:**

In the given question, a Statement of Assertion (A) is followed by a Statement of

Reason (R). Choose the correct option.

Statement A (Assertion): If a vertical tower of height 50 m casts a shadow of length $50\sqrt{3}$ m, then the angle of elevation of the Sun is 60°.

Statement R(Reason): If the angle of elevation of the Sun decreases, then the length of shadow of a tower increases.

(A)Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(B) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(C) Assertion (A) is true but reason (R) is false.

(D) Assertion (A) is false but reason (R) is true.

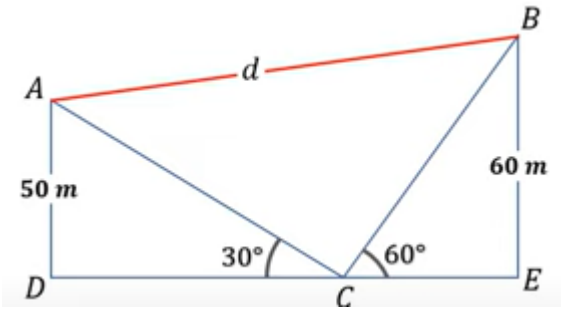
Questions of 2 marks each

Q.11. A 1.6 m long girl stands at a distance of 3.2 m from a lamp post and casts a shadow of 4.8 m on the ground. Find the height of the lamp post.

Q.12. If the angles of elevation of the top of a tower from two points distant a and b ($a > b$) from its foot and in the same straight line from it are respectively 30° and 60°, then find the height of the tower.

Q.13. Find the height of a mountain if the angle of elevation of its top at an unknown distance from its base is 60° and at a distance 10 km farther off from the mountain along the same line, the angle of elevation is 30°.

Questions of 3 marks each	
Q.14.	The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 45°. If the tower is 30m high, find the height of the building.
Q.15.	As observed from the top of a lighthouse, 100 m high above sea level, the angle of depression of a ship, sailing directly towards it, changes from 30° to 60°. Determine the distance travelled by the ship during the period of observation.
Q.16.	From the top of a tower, 100 m high, a man observes two cars on the opposite sides of the tower and in same straight line with its base, with angles of depression 30° and 45°. Find the distance between the cars. [Take $\sqrt{3} = 1{\cdot}732$]
Questions of 5 marks each	
Q.17.	A man standing on the deck of a ship, which is 10 m above water level, observes the angle of elevation of the top of a hill as 60° and the angle of depression of the base of hill as 30°. Find the distance of the hill from the ship and the height of the hill. [Take $\sqrt{3} = 1{\cdot}732$]
Q.18.	The angle of elevation of an aeroplane from a point A on the ground is 60°. After a flight of 15 seconds, the angle of elevation changes to 30°. If the aeroplane is flying at a constant height of $1500\sqrt{3}$ m, find the speed of the plane in km/hr.
Q.19.	Amit, standing on a horizontal plan, finds a bird flying at a distance of 200m from him at an elevation of 30°. Deepak standing on the roof of a 50m high building, finds the angle of elevation of the same bird to be 45°. Amit and Deepak are on opposite sides of the bird. Find the distance of the bird from Deepak.
Q.20	The angle of elevation of a cloud from a point 200 m above the lake is 30° and the angle of depression of its reflection in the lake is 60° , find the height of the cloud above the lake.
Q.21	A vertical tower stands on a horizontal plane and is surrounded by a vertical flag staff of height h. At a point on the plane, the angles of elevation of the bottom and top of the flag staff are α and β respectively. Prove that the height of the tower is $\frac{h \tan \alpha}{\tan \beta - \tan \alpha}$

Q.22	From the top of a light house, the angles of depression of two ships on the opposite sides of it are observed to be 30° and 60°. If the height of the light house is h metres and the line joining the ships passes through the foot of the light house, show that the distance between the ships is $\frac{4}{\sqrt{3}}$ h metres.
Case study-based (4 marks)	
Q.23.	Kite festival is celebrated in many countries at different times of the year. In India, every year 14th January is celebrated as International Kite Day. On this day many people visit India and participate in the festival by flying various kinds of kites. The picture below shows three kites flying together.   In the figure given above, the angles of elevation of two kites (Points A and B) from the hands of a man (Point C) are found to be 30 and 60 respectively. Taking AD = 50 m and BE = 60 m, find (i) The lengths of strings used (take them straight) for kites A and B as shown in the figure. (ii) The distance 'd' between these two kites.

ANSWERS

Q.1	A	**Q.2**	D	**Q.3**	C	**Q.4**	C
Q.5	C	**Q.6**	A	**Q.7**	B	**Q.8**	D
Q.9	A	**Q.10**	D	**Q.11**	$2\frac{2}{3}$ m	**Q.12**	$\sqrt{ab}$
Q.13	$5\sqrt{3}$ km	**Q.14**	$10\sqrt{3}$m	**Q.15**	$\frac{200\sqrt{3}}{3}$ m	**Q.16**	273.2m
Q.17	17.32m, 40m	**Q.18**	720km/h	**Q.19**	$50\sqrt{2}$m	**Q.20**	400 m
Q.23.	(i) AC = 100m BC = $40\sqrt{3}$m d = $20\sqrt{37}$m						