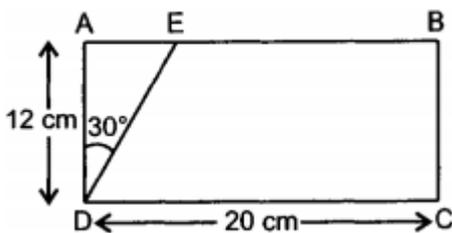


INTRODUCTION TO TRIGONOMETRY WS 5

Class 10 - Mathematics

Section A

1. If  $2\theta + 45^\circ$  and  $30^\circ - \theta$ , are acute angles, find the degree measure of  $\theta$  satisfying  $\sin(2\theta + 45^\circ) = \cos(30^\circ - \theta)$ . [3]
2. Evaluate:  $\operatorname{cosec}^3 30^\circ \cdot \cos 60^\circ \cdot \tan^3 45^\circ \cdot \sin^2 90^\circ \cdot \sec^2 45^\circ \cdot \cot 30^\circ$  [3]
3. In a  $\triangle ABC$ ,  $\angle B = 90^\circ$  and  $\tan A = \frac{1}{\sqrt{3}}$ . Prove that: [3]
  - i.  $\sin A \cos C + \cos A \sin C = 1$
  - ii.  $\cos A \cos C - \sin A \sin C = 0$
4. Evaluate:  $\frac{\sin 30^\circ + \tan 45^\circ - \operatorname{cosec} 60^\circ}{\sec 30^\circ + \cos 60^\circ + \cot 45^\circ}$  [3]
5. Evaluate:  $4(\sin^4 30^\circ + \cos^2 60^\circ) - 3(\cos^2 45^\circ - \sin^2 90^\circ) - \sin^2 60^\circ$  [3]
6. If  $\tan(A + B) = 1$  and  $\tan(A - B) = \frac{1}{\sqrt{3}}$ ,  $0^\circ < A + B < 90^\circ$ ,  $A > B$ , then find the values of A and B. [3]
7. Evaluate:  $\tan^2 30^\circ + \tan^2 60^\circ + \tan^2 45^\circ$  [3]
8. In a right triangle ABC, right-angled at B, if  $\tan A = 1$ , then verify that  $2 \sin A \cos A = 1$ . [3]
9. Evaluate:  $\cos^2 30^\circ + \cos^2 45^\circ + \cos^2 60^\circ + \cos^2 90^\circ$  [3]
10. In a  $\triangle ABC$ , right angled at A, if  $\tan C = \sqrt{3}$ , find the value of  $\sin B \cos C + \cos B \sin C$ . [3]
11. In a  $\triangle ABC$ ,  $\angle C = 90^\circ$  and  $\tan A = \frac{1}{\sqrt{3}}$ . Find the values of: [3]
  - i.  $(\sin A \cos B + \cos A \sin B)$
  - ii.  $(\cos A \cos B - \sin A \sin B)$
12. Evaluate:  $2 \sin^2 30^\circ - 3 \cos^2 45^\circ + \tan^2 60^\circ$  [3]
13. If  $\sin(A+B)=1$  and  $\cos(A-B) = \frac{\sqrt{3}}{2}$ ,  $0^\circ < A + B \leq 90^\circ$ ,  $A > B$  then find A and B. [3]
14. If  $\sin(A - B) = \frac{1}{2}$ ,  $\cos(A + B) = \frac{1}{2}$ ,  $0^\circ < A + B \leq 90^\circ$ ,  $A > B$ , find the values of A and B. [3]
15. In an acute angled triangle ABC, if  $\tan(A+B-C) = 1$  and,  $\sec(B+C-A)=2$ , find the values of A, B and C. [3]
16. In the given figure, ABCD is a rectangle with AD = 12 cm and DC = 20 cm. Line segment DE is drawn making an angle of  $30^\circ$  with AD, intersecting AB at E. Find the length of DE and AE. [3]



17. Prove that:  $\frac{1 - \sin 60^\circ}{\cos 60^\circ} = \frac{\tan 60^\circ - 1}{\tan 60^\circ + 1}$ . [3]
18. The altitude AD of  $\triangle ABC$ , in which  $\angle A$  is obtuse and, AD = 10 cm If BD = 10 cm and CD =  $10\sqrt{3}$ cm, determine  $\angle A$ . [3]

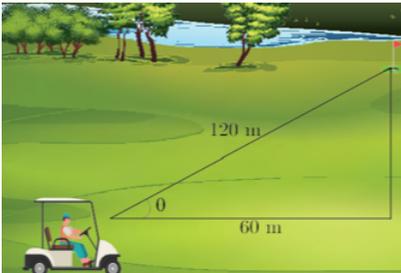
Section B

Question No. 19 to 22 are based on the given text. Read the text carefully and answer the questions: [4]

Golf is a game played in an open field where the golfer plays his golf ball into a hole by using different types of clubs (golf instruments). In golf, a golfer plays a number of holes in a given order. 18 holes played in an order controlled by the golf course design, normally make up a game.



On your approach shot to the ninth green, the Global Positioning System (GPS) your cart is equipped with tells you the pin is 120 meter away.



19. The distance plate states the straight line distance to the hole is 60 meter. Relative to a straight line between the plate and the hole, at what acute angle should you hit the shot?
20. What is the value of the tangent of the above angle?
21. What is the length of the side opposite to the angle  $\theta$  in the given picture?
22. What is the value of tangent of angle A?

**Question No. 23 to 26 are based on the given text. Read the text carefully and answer the questions:** [4]

A heavy-duty ramp is used to winch heavy appliances from street level up to a warehouse loading dock. If the ramp is 2 meter high and the incline is 4 meter long.

(Use  $\sqrt{3} = 1.73$ )



23. What angle does the dock make with the street?
24. How long is the base of the ramp? (In round figure)
25. If the ramp is inclined at the angle of  $45^\circ$ , what is the height of the ramp? Use  $\sqrt{2} = 1.41$
26. If the ramp is inclined at an angle of  $45^\circ$ , what is the length of ramp?

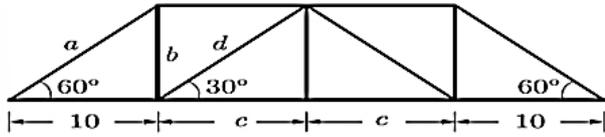
**Question No. 27 to 30 are based on the given text. Read the text carefully and answer the questions:** [4]

A truss is a structure that consists of members organized into connected triangles so that the overall assembly behaves as a single object. Trusses are most commonly used in bridges, roofs and towers.



Consider the line diagram of truss shown below and find the following length

(Use  $\sqrt{3} = 1.732$ )



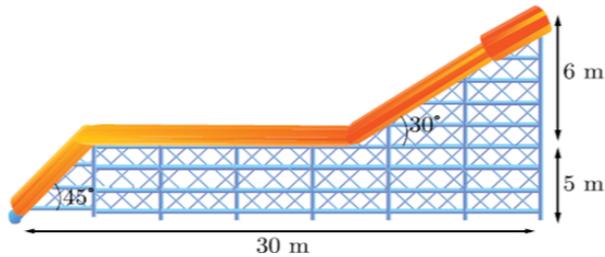
27. What is the length a?
28. What is the length b?
29. What is the length d?
30. What is the length c?

**Question No. 31 to 34 are based on the given text. Read the text carefully and answer the questions:**

[4]

**Water Slide Design:** Slide shown in the figure is part of a design for a water slide.

(Use  $\sqrt{2} = 1.41$  and  $\sqrt{3} = 1.73$ )



31. What is the length of flat part of slide.
32. Which inclined part is more comfortable for small children?
33. What is the total length of the slide?
34. If there is only one slide in the water slide design. What will be its length?