Introduction to Trigonometry

Multiple Choice Questions

Q: 1 **In a right-angled triangle, there is an acute angle *p* such that tan *p* = $\frac{12}{5}$.**

What is the value of sec (90° - *p*)?

1 $\frac{5}{13}$ **2** $\frac{5}{12}$ **3** $\frac{12}{13}$ **4** $\frac{13}{12}$

Q: 2 **Two statements are given below - one labelled Assertion (A) and the other labelled Reason (R). Read the statements carefully and choose the option that correctly describes statements (A) and (R).**

***Assertion (A)* : The value of tan 20° = $\frac{\tan 60°}{3} = \frac{\sqrt{3}}{3}$.**

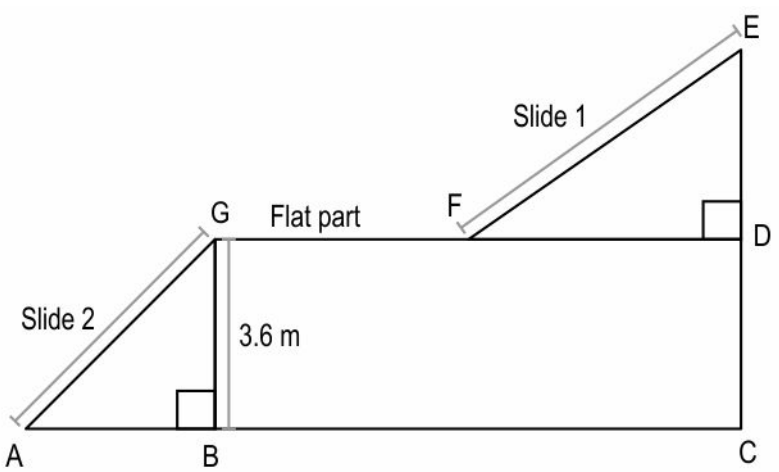
***Reason (R)* : For an acute angle θ, tan ($\frac{1}{3}$ θ) = $\frac{1}{3}$ tan θ.**

1 Both (A) and (R) are true and (R) is the correct explanation for (A).
2 Both (A) and (R) are true but (R) is not the correct explanation for (A).
3 (A) is false and (R) is true.
4 Both (A) and (R) are false.

Case-Based Questions

Study the given information and answer the questions that follow.

Shown below is the rough figure of the side view of a proposed water slide which has to be constructed in a water park.



(Note: The figure is not to scale.)
(Take √2 = 1.4, √3 = *1.7, wherever required.)*

Q: 3 **What should be the measure of the angle between slide 2 and ground if the length of AB is 1.2√3 m?**

1 30° **2** 45° **3** 60° **4** 90°

Q: 4 **What should be the value of tan AGB if the length of slide 2 is 6 m?**

1 $\frac{4}{3}$ **2** $\frac{4}{5}$ **3** $\frac{3}{4}$ **4** $\frac{3}{5}$

Q: 5 **If slide 1 makes an angle of 150° with the flat part and FD = 8.5 m, what is the height of the top point of slide 1 from the ground (EC)?**

1 5 m **2** 8.6 m **3** 10 m **4** 12.1 m

Q: 6 **What should be the length of slide 2 if the angle between slide 2 and ground is 30°?**

1 4.24 m **2** 5.04 m **3** 6.12 m **4** 7.2 m

Q: 7 **If ∠GAB = ∠EFD and ∠AGB = ∠FED, which of these is equal to sec ∠GAB?**

1 cos ∠EFD **2** cos ∠AGB **3** cosec ∠FED **4** cosec ∠EFD

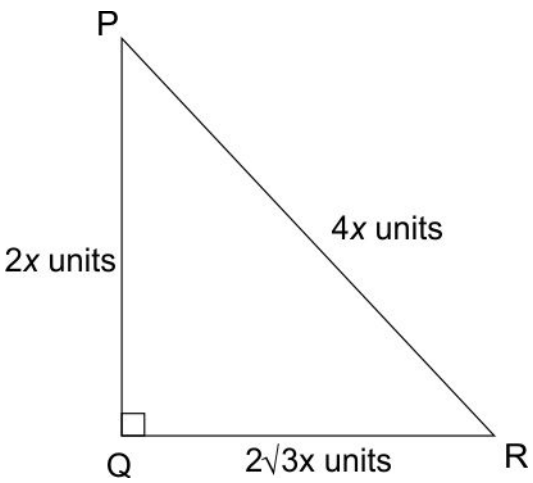
Free Response Questions

Q: 8 **Consider the statement given below.** **[1]**

In a right triangle, the value of cos A = √2 for some acute angle A.

Is the statement true or false? Give a valid reason.

Q: 9 **Shown below is a right-angled ▲PQR.** **[1]**



(Note: The figure is not to scale.)

What is measure of ∠QPR? Show your work.

Q: 10 **Prove that:** **[5]**

$(1 + \tan x + \sec x)^2 = 2(1 + \sec x)(\sec x + \tan x)$

Q.No	Correct Answers
1	4
2	4
3	3
4	1
5	2
6	4
7	3

Q.No	What to look for	Marks
8	Writes that cos A = $\frac{\text{adjacent}}{\text{hypotenuse}}$, as hypotenuse is the largest side in a right triangle, the cosine ratio is always less than 1.	0.5
	Concludes that as √2 > 1, the given statement is false.	0.5
9	Uses an appropriate trigonometric ratio and finds the measure of ∠QPR as 60°. For example: tan ∠QPR = $\frac{2\sqrt{3}x}{2x}$ = tan 60° => ∠QPR = 60°	1
10	Expands the LHS of the given equation as: $1 + \tan^2 x + \sec^2 x + 2\tan x + 2\sec x + 2(\tan x)(\sec x)$	1
	Uses the identity $\sec^2 x - \tan^2 x = 1$ to simplify the above expression as: $2\sec^2 x + 2\tan x + 2\sec x + 2(\tan x)(\sec x)$	2
	Regroups the above expression as: $2\sec x (\sec x + 1) + 2\tan x (\sec x + 1)$	1
	Completes the factorisation of the above expression to get RHS as: $2(1 + \sec x)(\sec x + \tan x)$	1