	BCM SCHOOL, BASANT AVENUE, DUGRI ROAD, LUDHIANA Class XI (Trigonometric functions)
Sol 1.	(c) Range of sin θ, cos θ = [-1,1] and sec θ = $\frac{1}{\cos\theta}$. So, $\lvert\sec\theta\rvert \geq 1$. Identify which violates.
2.	(b) Convert 1 rad = $\frac{180°}{\pi} \approx 57°$. Compare 1° and 1 radian
3.	(d) Use identity of sin 2x and maximum value of sine function is 1.
4.	Range: (-∞, -1] ∪ [1/3, ∞) We know, cos x ∈ [-1,1]. Using it, find range of 1−2cos x, then take reciprocal carefully. Exclude denominator = 0.
5.	General solution: x = -π/4 + nπ 1 + tan x = 0 ⇒ tan x = −1. Use general solution of tan x.
6.	tan 2α = 56/33 $\cos(\alpha+\beta) = \frac{4}{5}$, So $\sin(\alpha+\beta) = \frac{3}{5} \Rightarrow \tan(\alpha+\beta) = \frac{3}{4}$ And $\sin(\alpha-\beta) = \frac{5}{13}$, so $\cos(\alpha-\beta) = \frac{12}{13} \Rightarrow \tan(\alpha-\beta) = \frac{5}{12}$ Now, $\tan 2\alpha = \tan\big((\alpha+\beta)+(\alpha-\beta)\big)$ $\tan 2\alpha = \frac{\tan(\alpha+\beta)+\tan(\alpha-\beta)}{1-\tan(\alpha+\beta)\tan(\alpha-\beta)} = \frac{\frac{3}{4}+\frac{5}{12}}{1-\frac{3}{4}\cdot\frac{5}{12}} = \frac{56}{33}$
7.	$\frac{1}{8}$ $\cos\frac{7\pi}{8} = \cos(\pi-\frac{\pi}{8}) = -\cos\frac{\pi}{8}$ and $\cos\frac{5\pi}{8} = \cos\left(\pi-\frac{3\pi}{8}\right) = -\cos\frac{3\pi}{8}$ So, we have $(1-\cos^2\frac{\pi}{8})(1-\cos^2\frac{3\pi}{8}) = \sin^2\frac{\pi}{8}\sin^2\frac{3\pi}{8}$ $\Longrightarrow \frac{1}{4}(2\sin\frac{\pi}{8}\sin\frac{3\pi}{8})^2 = \frac{1}{8}$ (By using product to sum identity)
8.	$\frac{3}{2}$ Use cos²x = (1 + cos2x)/2 to get $\frac{1}{2}[1+\cos 2x+1+\cos(2x+\pi/3)+1+\cos(2x-2\pi/3)]$ $= \frac{1}{2}\left[3+\cos 2x+2\cos 2x\cos\frac{2\pi}{3}\right]$ (By using sum to product identity) $= \frac{1}{2}[3+\cos 2x-\cos 2x] = \frac{3}{2}$
9.	On dividing and multiplying by $2\sin\pi/7$, $=\frac{1}{2\sin\frac{\pi}{7}}\left(\sin\frac{2\pi}{7}\cos\frac{2\pi}{7}\cos\frac{4\pi}{7}\right) = \frac{1}{4\sin\frac{\pi}{7}}\left(\sin\frac{4\pi}{7}\cos\frac{4\pi}{7}\right) = \frac{1}{8\sin\frac{\pi}{7}}\left(\sin\frac{8\pi}{7}\right)$ $= \frac{1}{8\sin\frac{\pi}{7}}(\sin(\pi+\pi/7)) = -\frac{1\sin\frac{\pi}{7}}{8\sin\frac{\pi}{7}} = -\frac{1}{8}$
10.	(i) 2 points (ii) 2 points (iii) 4 points Solve sin x = cos x ⇒ tan x = 1. Count solutions in [-2π, 2π]. OR 2 points Check if sin x = √2 is possible using range of sine function.