

# Exam-4 Practice

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## 1 REMARK:

I have not included all kinds of questions that you will face on the exam, but this practice will help you understand all the concepts important in learning trigonometry and all that is involved in the exam. The answers below may come out to be wrong! If you are confident that you are correct and getting a different answer from what I have posted, let me know. In case of a TRUE/FALSE question, try to give the correct reasoning why it is TRUE or FALSE, and if FALSE, try correcting the statement. For the last question, which is to draw a graph, I will solve it tomorrow in the discussion session, so I am not putting it up here. ALL THE BEST!!

## 2 Questions:

1. Find all the solutions of the equation in the interval  $[0, \pi]$ .

$$3 \csc(4x) - 2 = 1$$

**Answer:**  $\frac{\pi}{8}, \frac{5\pi}{8}$

2. The length of the sides of a triangle are  $a, b, c$  and the angles opposite to each of those respective sides are labelled as  $A, B, C$ . You are given that  $A = \frac{\pi}{2}, B = \frac{\pi}{3}$  and  $a = 1$ . Find the values of  $b, c, C$ .

**Answer:**  $b = \frac{\sqrt{3}}{2}, c = \frac{1}{2}, C = \frac{\pi}{6}$ .

3. What is the range of  $4 \sec(4x) - 4$ ?

**Answer:**  $(-\infty, -8] \cup [0, \infty)$ .

4. Solve for  $x$  in the interval  $[0, 2\pi]$ :

$$\cos(x) - 2 \sin^2(x) + 1 = 0$$

**Answer:**  $\pi, \frac{\pi}{3}, \frac{5\pi}{3}$ .

5. Specify the interval where  $\cos \theta > \sin \theta$ .

**Answer:**  $(0, \frac{\pi}{4}) \cup (\frac{5\pi}{4}, 2\pi)$ .

6. The length of the three sides of a triangle are 3, 4, 5. Find the cosine of the angle between the sides of length 4, 5.

**Answer:**  $\frac{4}{5}$ .

7. How many possible triangles can be constructed using the following information and why:  $a = 4, b = 4\sqrt{2}, A = \frac{\pi}{6}$ ?

**Answer:** 2 possible triangles.

8. Simplify:  $\cos \theta + \frac{\tan^2 \theta}{\sec(-\theta)}$ .

**Answer:**  $\sec \theta$

9. Find the value of  $\sin(\operatorname{arccot}(-1/2))$ .

**Answer:**  $-2/\sqrt{5}$

10. TRUE/FALSE: If  $\theta$  is in the fourth quadrant, then  $\cot \theta = \sqrt{\csc^2 \theta - 1}$ .

**Answer:** FALSE

11. Aegon and Daenerys are looking at their dragon Balerion lying inside his pit from the top. The angle of depression for Aegon is  $\frac{\pi}{4}$  and that for Daenerys is  $\frac{\pi}{6}$ . If they are 1,000 ft apart from each other and the dragon is lying exactly perpendicular below the ground, find the depth of the Balerion's pit.

**Answer:**  $\frac{1000}{\sqrt{3}+1}$  ft.

12. Where is the vertical asymptote for  $\tan(3x/2)$ , between  $[0, \pi/2]$ ?

**Answer:**  $x = \pi/3$

13. TRUE/FALSE: If  $\sin \theta$  and  $\sec \theta$  are both negative, then  $\cot \theta$  is also negative.

**Answer:** FALSE

14. Sketch the graph of the following function:

$$f(x) = -4 \cos(4x + \pi) + 4$$