Trigonometry Questions PDF along with detailed Solutions

Trigonometry questions are a major type of questions asked in competitive exams. These questions carry a weightage of 3-4 questions (6-8 marks) in SSC exams. To get a good rank in competitive exams, you should have a great practice of a variety of trigonometry questions

Here are some tips for solving Trigonometry questions: Clear the basic concepts, Memorise the key ratios, Memorise the identities and formulas, practice a variety of questions, and crack the question you should have a great understanding and practice.

So, we have attached 10 questions of Trigonometry for you to practice with. You should aim to solve these questions in less than half a minute for each.

Practice Questions on Trigonometry

You can also download the Trigonometry questions and answers pdf. Just click on the **Download PDF** button. So let's start with the very first question.

Q:1 Which of the following is equivalent to the following trigonometric expression?

$(\cot^2 x - 1)/(\cot^2 x + 1) \times \sin 2x$

1. sin 4x

2. (sin 4x)/2

3. cos 4x

4. (cos 4x)/2

(**Difficulty:** 3, **Estimated Time:** 20 Seconds) This was not an easy one! Did you get it right?

Q:2 x is an obtuse angle such that $(\sin x - \cos x)^2/(\sin x + \cos x) = 3/\sqrt{2}$, then what is the value of cos (x + 15°)?

1. $\frac{1}{2}$

2. $\frac{\sqrt{3}}{2}$

3. $-\frac{1}{2}$

4. $-\frac{\sqrt{3}}{2}$

(**Difficulty:** 3, **Estimated Time:** 20 Seconds) In these questions, keep in mind the range of angle given in the question!

Q:3 What is the value of tan 23° cot 67° - sin^2 41° - 1/ (sin^2 67°) + 2 tan 41° tan 49°?

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1. 1

2. 0

3. $-\cos^2 41°$

4. $\cos^2 41°$

(**Difficulty:** 2, **Estimated Time:** 10 Seconds) Do you remember some Pythagorean triplets?

Q:4 Which of the following option is equivalent to the following trigonometric expression?

$4 \sin^2(\pi/4 + x) \sin^2(\pi/4 − x) - 4 \sin^2 x \cos^2 x$

1. 1

2. $\cos 2x$

3. $\cos 4x$

4. $\sin 4x$

(**Difficulty:** 3, **Estimated Time:** 20 Seconds) Should we increase the level?

Q:5 A building of height $100\sqrt{3}$ m is illuminated by the sun at an angle of 60°. A person P is a distance of 200 m more than the tip of the shadow of the building. What is the angle of elevation of the top of the tower for person P?

1. 15°

2. 25°

3. 30°

4. 45°

(**Difficulty:** 3, **Estimated Time:** 20 Seconds) We're halfway through. Have you got all your questions correct so far?

Q:6 If $2 \sin x − 4 \sin^3 x = \sec x/2$, then what is the value of $\sin 4x$?

1. 0

2. 1/2

3. $\sqrt{3}/2$

4. 1

(**Difficulty:** 4, **Estimated Time:** 30 Seconds) This was a test of your concepts!

Q:7 If for some acute angle A ≠ 0, tan 3A = 4 tan A, then what is the value of tan A?

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1. 1/√3

2. 1/√5

3. 1/√7

4. 1/√11

(**Difficulty:** 3, **Estimated Time:** 20 Seconds) This was a hard nut to crack, be prepared for such questions in exam!

Q:8 What is the value of the following trigonometric expression?

(sin 225° + tan 210°) cos 210°

(Take √6 = 2.45)

1. 0.1125

2. 0.2225

3. 0.3125

4. 0.5625

(**Difficulty:** 2, **Estimated Time:** 15 Seconds) Another easy one!

Q:9 For a bird flying at a height of 10√3 m, the angle of depression to the top of a tree and the bottom of the tree at a particular moment is 30° and 45° respectively. What is the height of the tree (in m)? (Take √3 = 1.732)

1. 3.66

2. 7.32

3. 8.66

4. 12.32

(**Difficulty:** 3, **Estimated Time:** 20 Seconds) Yes, You know how to solve such questions!

Q:10 As the angle of elevation of the sun increases from 30º to 60º, the length of the shadow of a building gets reduced by 20 meters. Find the height of the building.

1. 17.32 m

2. 34.64 m

3. 18 m

4. 35 m

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(**Difficulty:** 2, **Estimated Time:** 15 Seconds) Do you remember the formulas?

Answer Key

Let's check out your score in this test.

1. (2)	**2.** (3)	**3.** (4)	**4.** (3)	**5.** (3)
6. (4)	**7.** (4)	**8.** (1)	**9.** (2)	**10.** (1)

Comment below your score, considering each question has 1 mark only. If you scored 8 to 10, congratulations! You are one step closer to selection. If you have scored 5 to 8 marks, then you are doing well, keep it up. If you have scored less than 5 marks then you need to work a little harder on this subject. But don't worry, we are here to help you master the subject.

Let's check the answers and solutions and try to find out what went wrong.

Answers and Solutions

Q:1 The correct answer is **Option 2** i.e. **(sin 4x)/2.**

$(\cot^2 x - 1)/(\cot^2 x + 1) \times \sin 2x$

$\Rightarrow \{(\cos^2 x/\sin^2 x) - 1\}/\{(\cos^2 x/\sin^2 x) + 1\} \times \sin 2x$

$\Rightarrow (\cos^2 x - \sin^2 x)/(\cos^2 x + \sin^2 x) \times \sin 2x$

$\Rightarrow \cos 2x \times \sin 2x$ [∵ $\cos 2A = \cos^2 A - \sin^2 A$ and $\cos^2 A + \sin^2 A = 1$]

$\Rightarrow (2\sin 2x \cos 2x)/2$

$\Rightarrow (\sin 4x)/2$ [∵ $\sin 2A = 2\sin A.\cos A$]

Q:2 The correct answer is **Option 3** i.e. **-1/2.**

$\Rightarrow \sin x - \cos x = \sqrt{2} \times \{(\sin x)/\sqrt{2} - (\cos x)/\sqrt{2}\}$

$\Rightarrow \sqrt{2} \times \sin (x - 45°)$

[∵ $\sin (A - B) = \sin A \cos B - \cos A \sin B$]

$\Rightarrow \sin x + \cos x = \sqrt{2} \times \{(\sin x)/\sqrt{2} + (\cos x)/\sqrt{2}\}$

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$\Rightarrow \sqrt{2} \times \sin(x + 45°)$

$\therefore (\sin x - \cos x)^2/(\sin x + \cos x) = 3/\sqrt{2}$

$\Rightarrow \{2 \times \sin^2(x - 45°)\}/\{\sqrt{2} \times \sin(x + 45°)\} = 3/\sqrt{2}$

$\Rightarrow \sin^2(x - 45°)/\sin(x + 45°) = 3/2$

Let $x = 45° - y$

$\Rightarrow \sin^2 y/\sin(90 - y) = 3/2$

$\Rightarrow \sin^2 y/\cos y = 3/2$

$\Rightarrow (1 - \cos^2 y)/(\cos y) = 3/2$

$\Rightarrow 2 - 2\cos^2 y = 3\cos y$

$\Rightarrow 2\cos^2 y - 3\cos y - 2 = 0$

$\Rightarrow 2\cos^2 y - 4\cos y + \cos y - 2 = 0$

$\Rightarrow 2\cos y(\cos y - 2) + 1(\cos y - 2) = 0$

$\Rightarrow (2\cos y + 1)(\cos y - 2) = 0$

$\Rightarrow \cos y = -1/2$

If x is obtuse, $-135° < y < -45°$ [$\because y = x - 45°$]

$\therefore y = -60°$ and, $x = 105°$

$\Rightarrow \cos(x + 15°) = \cos 120° = -1/2$

Q:3 The correct answer is **option 4 i.e. $\cos^2 41°$.**

$\cot 67° = \cot(90° - 23°) = \tan 23°$

$\sin 67° = \sin(90° - 23°) = \cos 23°$

$\tan 49° = \tan(90 - 41) = \cot 41°$

$\therefore \tan 23° \cot 67° - \sin^2 41° - 1/(\sin^2 67°) + 2\tan 41° \tan 49°$

$\Rightarrow \tan^2 23° - \sin^2 41° - 1/(\cos^2 23°) + 2\tan 41° \cot 41°$

[$\tan x \cot x = 1$ and $1/\cos x = \sec x$]

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$\Rightarrow \tan^2 23° - \sin^2 41° - \sec^2 23° + 2$

$\Rightarrow 1 + \tan^2 23° + 1 - \sin^2 41° - \sec^2 23°$

$\Rightarrow \sec^2 23° + \cos^2 41° - \sec^2 23°$ [∵ $\sec^2 x = 1 + \tan^2 x$ and $1 - \sin^2 x = \cos^2 x$]

$\Rightarrow \cos^2 41°$

Q:4 The correct answer is **Option 3** i.e. **cos 4x**

$\sin A \sin B = \{\cos (A - B) - \cos (A + B)\} /2$

$\sin (\pi/4 + x) \sin (\pi/4 - x) = \{\cos 2x - \cos (\pi/2)\} /2$

$\Rightarrow (\cos 2x) /2$

$\therefore 4 \sin^2 (\pi/4 + x) \sin^2 (\pi/4 - x) - 4 \sin^2 x \cos^2 x = 4 \times \{(\cos 2x)/2\}^2 - (2 \sin x \cos x)^2$

$\Rightarrow \cos^2 2x - \sin^2 2x$ [∵ $\sin 2A = 2 \sin A \cos A$]

$\Rightarrow \cos 4x$ [∵ $\cos 2A = \cos^2 A - \sin^2 A$]

Q:5 The correct answer is **Option 3** i.e. **30°.**

In triangle ABC,

AB = 100√3

tan ∠ACB = AB/BC

tan 60° = 100√3/BC

∴ BC = 100 m

BD = BC + CD ⇒ 100 + 200 = 300 m

In triangle ABD

tan ∠ADB = AB/BD

tan ∠ADB = (100√3) /300

tan ∠ADB = 1/√3

∠ ADB = 30°

Q:6 The correct answer is **option 4** i.e. **1**

$2 \sin x - 4 \sin^3 x = \sec x/2$

$2 \sin x (1 - 2 \sin^2 x) = 1/ (2 \cos x)$ [∵ sec x = 1/ cos x]

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

$2 \sin 2x \cos 2x = 1$ [∵ sin 2A = 2 sin A cos A and cos 2A = 1 − 2 sin² A]

$2 \sin 2x \cos 2x = 1$

$\sin 4x = 1$

Q:7 The correct answer is **Option 4** i.e. **1/√11**.

tan 3A = 4 tan A

$(3 \tan A - \tan^3 A) / (1 - 3 \tan^2 A) = 4 \tan A$

$\tan A (3 - \tan^2 A) / (1 - 3 \tan^2 A) = 4 \tan A$

$(3 - \tan^2 A) / (1 - 3 \tan^2 A) = 4$

$3 - \tan^2 A = 4 - 12 \tan^2 A$

$11 \tan^2 A = 1$

$\tan A = 1/\sqrt{11}$

Q:8 The correct answer is **Option 1** i.e. **0.1125.**

sin 225° = sin (180 + 45) = - sin 45° = -1/√2

tan 210° = tan (180 + 30) = tan 30° = 1/√3

cos 210° = cos (180 + 30) = - cos 30° = - √3/2

(sin 225° + tan 210°) cos 210° = (1/√3 − 1/√2) × (-√3/2)

⇒ (√3 - √2)/√6 × √3/2

⇒ (√3 - √2)/(2√2)

Multiply the numerator and denominator by √2

⇒ (√6 − 2)/4

⇒ (2.45 − 2)/4 = 0.45/4

⇒ 0.1125

Q:9 The correct answer is **option 2 i.e. 7.32**

Let E be the bird and AB be the tree

In triangle EBC

tan ∠ EBC = EC/BC

tan 45° = 10√3/BC

∴ BC = 10√3 m

In triangle AED

tan ∠ EAD = ED/AD

tan 30° = ED/ (10√3)

ED = 10 m

Height of tree = EC − ED ⇒ 10√3 − 10

⇒ 10 × 1.732 − 10

⇒ 7.32 m

Q:10 The correct answer is **option 1** i.e. **17.32 m**

Let, AB = Height of the building = x meters

BD = y meters

DC = 20 meters (given)

In triangle ABD, we have:

tan 60° = AB/BD

⇒ √3 = x/y

⇒ y = x/√3   ......(i)

Now, In triangle ABC, we have

tan 30° = AB/BC

⇒ 1/√3 = x/(y + 20)

⇒ y + 20 = x√3   ......(ii)

From (i) and (ii)

x/√3 + 20 = x√3

⇒ 20 = x√3 - x/√3

⇒ 20 = (3x - x)/√3

⇒ 2x = 20√3

⇒ x = 10√3 = 10 × 1.732 = 17.32 m

So, this is it for today. We will meet again with another new topic. Till then, you can practice the questions again by downloading the PDF of Trigonometry.