# Important Questions 2010
# Class-XII- Maths
# Trigonometric Functions

**Q.1.** Find the degree measure corresponding to the following radian measures (Usep = 22/7):

(i) $\left(\frac{18\pi}{5}\right)^c$

(ii) -3)c

(iii) 11c

**Q.2.** Find the radian measure corresponding to the following degree measures:
(i) -300° (ii) 7° 30° (iii) 125° 30°

**Q.3.** Find the values of the following trigonometric ratios:

(i) sin $\frac{5\pi}{3}$

(ii) sin 3060°

(iii) cosec (-1200°)

(iv) tan (-585°)

(v) sin 4530° sin$\frac{-11\pi}{3}$

**Q.4.** Find the value of tan$\frac{13\pi}{12}$.

**Q.5.** Find the value of tan$\frac{\pi}{8}$.

**Q.6.** Find tan150 and hence show that tan150 + cot150 = 4.

**Q.7.** Evaluate: sin 130° Cos 110° + Cos 130° sin 110°

**Q.8.** Find the value of $\cot 30^0 \tan 60^0 \cos 120^0 \sin 150^0$.

**Q.9.** Show that:
cosec3$\frac{\pi}{6}$,$\cos\frac{\pi}{3}.\ \tan^2\frac{\pi}{4}.\ \sin\frac{\pi}{2}.\ \sec^2\frac{\pi}{4}.\ \cot\frac{\pi}{6} = 8\sqrt{3}$.

**Q.10.** Prove that: tan 560 = $\frac{\cos 11^0 + \sin 11^0}{\cos 11^0 - \sin 11^0}$

**Q.11.** Prove: tan150 + tan300 + tan150.tan300 = 1.

**Q.12.** Prove that: $\dfrac{\sin(180°+q)\cos(90°+q)\tan(270°-q)\cot(360°-q)}{\sin(360°-q)\cos(360°+q)\operatorname{cosec}(-q)\sin(270°+q)}=1$

**Q.13.** In a right triangle, the difference between two acute angles is p/18. Express the angles in degrees.

**Q.14.** The minute hand of a watch is 1.5 cm long. How far does its tip move in 40 minutes.

**Q.15.** The minute hand of a clock is 10 cm long. How far does the tip of the hand move in 20 minutes?

**Q.16.** The angles of a quadrilateral are in A.P. and the greatest angle is 120°. Express the angles in radians.

**Q.17.** The angle of a triangle are in AP. The number of degrees in the least is to the number of radians in the greatest as 60: л. Find the angles in degrees.

**Q.18.** Find the angle in radian through which a pendulum swings if its length is 75 cm and the tip describes an arc of length 15 cm.

**Q.19.** The large hand of a big clock is 35cm long. How many cm does its tip move in 9 minutes?

**Q.20.** Find the difference between the two acute angles of a right angled triangle is $\frac{3\pi}{10}$ radians.

**Q.21.** Express the angles in degrees the circular measure of the angle: $15°20'45''$.

**Q.22.** A wheel makes 360 revolutions per minute. Through how many radians does it turn in 1 second?

**Q.23.** A railway train is travelling on a circular curve of 1500 metres radius at the rate of 66 km/hr. Through what angle has it turned in 10 seconds?

**Q.24.**The radius of a circle is 30 cm. Find the length of an arc of this circle, if the length of the chord of a arc is 30 cm.

**Q.25.** If 5 sinx = 3. find value of $\dfrac{\sec x-\tan x}{\sec x+\tan x}$

**Q.26.** If tan A = x tan B, prove that : $\dfrac{Sin(A-B)}{Sin(A+B)}=\dfrac{x-1}{x+1}$

**Q.27.** If tanx = a/b, Show that: $\dfrac{a\sin x-b\cos x}{a\sin x+b\cos x}=\dfrac{a^2-b^2}{a^2+b^2}$

**Q.28.** Show that: (i) sina + sin(a + $\frac{2\pi}{3}$) + sin(a + $\frac{4\pi}{3}$) = 0

(ii)$2\cos\dfrac{\pi}{13}\cos\dfrac{9\pi}{13}+\cos\dfrac{3\pi}{13}+\cos\dfrac{5\pi}{13}=0$

**Q.29.** If tan a = $\dfrac{m}{m+1}$ *and* $\tan\beta=\dfrac{1}{2m+1}$, show that a + b = $\dfrac{\pi}{4}$

**Q.30.** Simplify: $\dfrac{\cos\left(\dfrac{\pi}{2}+\theta\right)\sec\left(\dfrac{3\pi}{2}+\theta\right)\sin(\pi+\theta)}{\operatorname{cosec}(-\theta)\cos\left(\dfrac{3\pi}{2}-\theta\right)\tan(\pi+\theta)}$

**Q.31 .** Simplify: $\dfrac{\cos(\pi-x)\sec^2\left(\dfrac{3\pi}{2}-x\right)\tan(2\pi-x)}{\sin(\pi-x)\cot\left(\dfrac{3\pi}{2}+x\right)}$

**Q. 32.** Prove: $\dfrac{\cos(\pi+x)\cos(-x)}{\sin(\pi-x)\cos\left(\dfrac{\pi}{2}+x\right)}=\cot^2 x$.

**Q. 33.** Prove: (i) $\dfrac{\sin x-\sin 3x}{\sin^2 x-\cos^2 x}=2\sin x\cdot$

(ii) $\dfrac{Sin(x+y)}{Sin(x-y)}=\dfrac{\tan x+\tan y}{\tan x-\tan y}$

**Q. 34.** If tanx = 2 tany, Prove that: $\dfrac{Sin(x+y)}{Sin(x-y)}=3.$

**Q. 35.** Prove that : a. $\sqrt{2+\sqrt{2+2\cos 4x}}$= 2 cos, 0<x< $\dfrac{\pi}{4}$

$\dfrac{Cosx}{1-Sinx}=\tan\left(\dfrac{\pi}{4}+\dfrac{x}{2}\right)$

**Q. 36.** Prove that :

(i) $\dfrac{\sin 2\theta}{1+\cos 2\theta}=\tan\theta$

(ii) $\dfrac{\sin 2\theta}{1-\cos 2\theta}=\cot\theta$

(iii) $\dfrac{1+\sin 2\theta+\cos 2\theta}{1+\sin 2\theta-\cos 2\theta}=\cot\theta$

(iv) $\tan\left(\dfrac{\pi}{4}+A\right)=\dfrac{1+\tan A}{1-\tan A}$

(v) $\dfrac{1+\sin\theta-\cos\theta}{1+\sin\theta+\cos\theta}=\tan\dfrac{\theta}{2}$

(vi) $\dfrac{1+\sin\theta}{\cos\theta}+\dfrac{\cos\theta}{1+\sin\theta}=2\sec\theta$

(vii) $\dfrac{\cos 9^0 + \sin 9^0}{\cos 9^0 - \sin 9^0} = \tan 54^0$

(viii) $\dfrac{\cos 8^0 - \sin 8^0}{\cos 8^0 + \sin 8^0} = \tan 37^0$

(ix) $\sqrt{2+\sqrt{2+2\cos 4\theta}} = 2\cos\theta$

**Q. 37.** Prove:

(i) $\dfrac{\cos^3 x - \sin^3 x}{\cos x - \sin x} = \dfrac{1}{2}(2+\sin 2x)$

(ii) $\dfrac{1-\cos 2x+\sin x}{\sin 2x+\cos x} = \tan x$

(iii) $\dfrac{\tan\left(\dfrac{\pi}{4}+x\right)}{\tan\left(\dfrac{\pi}{4}-x\right)} = \left(\dfrac{1+\tan x}{1-\tan x}\right)^2$

(iv) $\tan\left(\dfrac{\pi}{4}+\dfrac{x}{2}\right)$= tanx + secx

(v) $\dfrac{\tan 5x+\tan 3x}{\tan 5x-\tan 3x}$= 4 cos2x.co

**Q. 38.** Prove : tanA tan5A tan6A = tan6A – tan5A – tanA.

**Q. 39.** Prove that: (i) tan 8q – tan 6q - tan 2q = tan 8q tan 6q tan 2q
(ii) tan 13q - tan 9q - tan 4q = tan 13q tan 9q tan 4q

**Q. 40.** Prove: cot x cot2x – cot2x.cot3x – cot3x.cot x = 1.

**Q. 41.** Prove: (cosx + cosy)2 + (sinx + siny)2 = 4cos2 $\dfrac{x-y}{2}$

**Q. 42.** Prove: Cos2 $\dfrac{\pi}{8}+\cos^2\dfrac{3\pi}{8}+\cos^2\dfrac{5\pi}{8}+\cos^2\dfrac{7\pi}{8}=2$

**Q.43.** Prove: cos2x + cos2(x + $\dfrac{\pi}{3}$) + cos2(x - $\dfrac{\pi}{3}$) = $\dfrac{3}{2}$.

**Q. 44.** Find the principal solutions of the equation secx = -2.

**Q. 45.** Find Principal Solutions of:

(1) $\sqrt{3}$Cosecx = -2

(2) tanx = $\dfrac{-1}{\sqrt{3}}$

**Q. 46.** Find the general solution of: sin$\theta$ - cos $\theta$ = $\frac{1}{\sqrt{2}}$.

**Q. 47.** Find general solution of: tan $\frac{2x}{3}$ = $\sqrt{3}$

**Q. 48.** Find the general solutions of the following equations :
(i) sin 2q = $\frac{\sqrt{3}}{2}$ (ii) sin q = tan q

**Q. 49.** Find the general solutions of : $\sqrt{3}$sinx – cosx = $\sqrt{2}$.

**Q.50.** Solve : sin 2x + sin 4x + sin 6x = 0

**Q.51.** Solve: tan2x = -cot $\left(x+\frac{\pi}{3}\right)$.

**Q.52.** Solve the following equation: 2 cos2 q - 5 cos q + 2 = 0

**Q.53.** Solve the follwong equations :
(i) cos q + cos 3q + cos 2q = 0 (ii) cos q + sin q - cos 2 q + sin 2q
(iii) sin q + sin 2q + sin 3q + sin 4q = 0

**Q.54.** Solve the following equations:
(i) $\sqrt{3}$cos q + sin q = 1 (ii) sin q + cos q = 1

**Q.55.** Solve: (i) cos2x – cos8x + cos6x = 1 (2) tan2x = -cot$\left(x+\frac{\pi}{6}\right)$

**Q.56.** Solve the equations: (i) $\sqrt{2}\cos\theta+\sin\theta=2$ (ii) $\sqrt{2}\sec\theta+\tan\theta=1$.

**Q.57.** Solve the following equations:
**(1)** $\sqrt{3}\tan x+1=0$ **(2)** $Cosec\, x+\sqrt{2}=0$
**(3)** 2 Cos $\frac{3x}{5}$- 1=0 **(4)** tan 3x = -1

**Q.58.** Solve following equations:
(1) Cos3x = Sin2x (2) Sin3x + Cos2x = 0

**Q.59.** Solve:
(1) 2cos2x + 3sinx = 0 (4) 3tanx + Cotx = 5cosecx

**Q.60.** Find x from the following equations :
(i) cosec (90° + q) + x cos q cot (90° + q) = sin (90° + q)
(ii) x cot (90° + q) + tan (90° + q) sin q + cosec (90° + q) = 0

**Q.61.** If q lies in second quadrant, in which quadrant the following will lie?
(1) q/2 (2) 2q (3) -q.

**Q.62.** If tana = -2, find the values of the remaining trigonometric functions of a.

**Q.63.** If x lies in IIIrd quadrana and sin x = $\frac{1}{4}$ find sin $\frac{x}{2}$ and Cos $\frac{x}{2}$

**Q.64.** If sin q = 3/5,cos f = -12/13and q, f both lie in IInd quadrant, find the value of tan (q + f)

**Q.65.** If Cos q = $\frac{-3}{5}$ and p < q < $\frac{3\pi}{2}$ find the value of $\frac{Co\sec\theta + Cot\theta}{\sec\theta - \tan\theta}$

**Q.66.** If sin A = $\frac{4}{5}$ and cos B = $\frac{5}{13}$, Where 0 < A, B < $\frac{\pi}{2}$, find the values of the following :

(i) sin (A+B) (ii) cos (A+B) (iii) sin (A-B) (iv) cos (A-B)

**Q.67.** If cos A = - $\frac{24}{25}$ and cos B = $\frac{3}{5}$, Where p < A < $\frac{3\pi}{2} < B < 2\pi$,

**Q.68.** Find the following :

(i) sin (A+B) (ii) cos (A+B)

**Q.69.** If tanx = $\frac{3}{4}$, p<x<$\frac{3\pi}{2}$, Find the values of sin x/2, cos x/2 and tan x/2.

**Q.70.** If 0 £ x £ 2p and x lies in the IInd quadrant such that sin x = $\frac{1}{4}$, Find the values of cos $\frac{x}{2}$, $\sin\frac{x}{2}$, $and \tan\frac{x}{2}$

**Q.71.** Prove that: Cos $\left(\frac{3\pi}{4} + x\right) - Cos\left(\frac{3\pi}{4} - x\right) = -\sqrt{2}Sinx$.

**Q.72.** If A + B +C = Л, Prove that:

(i) Cos2A + Cos2B – Cos2C = 1 – 2SinA.SinB.CosC

(ii) $Sin2A + \sin 2B + \sin 2C = 4\sin A \sin B \sin C$

(iii) $\cos 2A + \cos 2B + \cos 2C = -1 - 4\cos A \cos B \cos C$

**Q.73.** If A + B = C Prove that: cos2A + cos2B + cos2C = 1 + 2 cosA cosB cosC.

Prove that: (i) (sin 3A + sin A) sin A + (cos 3A – cos A) cos A = 0

**.** (ii) cos 2 q cos $\frac{\theta}{2}$ - cos 3q cos $\frac{9\theta}{2}$ = sin 5 q sin $\frac{5\theta}{2}$

**Q.74** Prove that:

cos a + cos b + cos g + cos (a + b + g) = 4 cos $\frac{\alpha+\beta}{2}\cos\frac{\beta+\gamma}{2}\cos\frac{\gamma+\alpha}{2}$

**Q.75.** Prove that : $\frac{\cos 4x + \cos 3x + \cos 2x}{\sin 4x + \sin 3x + \sin 2x} = \cot 3x$

**Q.76.** If $\tan\theta = \frac{a}{b}$, prove that $b\cos 2\theta + a\sin 2\theta = b$

**Q.77.** Prove that:

(a) $\dfrac{\sin A+\sin 3A+\sin 5A}{CosA+Cos3A+Cos5A}=\tan 3A$

(b) $\dfrac{\sin 3A+\sin 5A+\sin 7A+\sin 9A}{\cos 3A+\cos 5A+\cos 7A+\cos 9A}=\tan 6A$

(c) $\dfrac{\sin A+2\sin 3A+\sin 5A}{\sin 3A+2\sin 5A+\sin 7A}=\dfrac{\sin 3A}{\sin 5A}$

(d) $\dfrac{\sin(\theta+\phi)-2\sin\theta+\sin(\theta-\phi)}{\cos(\theta+\phi)-2\cos\theta+\cos(\theta-\phi)}=\tan\theta$

**Q.78.** If sin 2A = l sin 2B, prove that: $\dfrac{\tan(A+B)}{\tan(A-B)}=\dfrac{\lambda+1}{\lambda-1}$

**Q.79.** If cos θ + sin θ = √2 cos θ , prove that cos θ – sin θ = √2 sin θ

**Q .80.** If $\sin A=\dfrac{1}{2}\left(x+\dfrac{1}{x}\right)$, Prove that $\sin 3A+\dfrac{1}{2}\left(x^3+\dfrac{1}{x^3}\right)=0$

**Q.81.** If $\cos\theta=\dfrac{1}{2}\left(x+\dfrac{1}{x}\right)$, Prove that (i) $\cos 2\theta=\dfrac{1}{2}\left(x^2+\dfrac{1}{x^2}\right)$(ii) $\cos 3\theta=\dfrac{1}{2}\left(x^3+\dfrac{1}{x^3}\right)$

**Q.82.** Prove that cot x cot 2x - cot 2x cot 3x - cot 3x cot x = 1

**Q.83.** Prove that:

(i) cos 4 $\dfrac{\pi}{8}+\cos^4\dfrac{3\pi}{8}+\cos^4\dfrac{5\pi}{8}+\cos^4\dfrac{7\pi}{8}=\dfrac{3}{2}$

(ii) sin 4 $\dfrac{\pi}{8}+\sin^4\dfrac{3\pi}{8}+\sin^4\dfrac{5\pi}{8}+\sin^4\dfrac{5\pi}{8}+\sin^4\dfrac{7\pi}{8}=\dfrac{3}{2}$

**Q.84.** Prove that : $\left(1+\cos\dfrac{\pi}{8}\right)\left(1+\cos\dfrac{3\pi}{8}\right)\left(1+\cos\dfrac{5\pi}{8}\right)\left(1+\cos\dfrac{7\pi}{8}\right)=\dfrac{1}{8}$

**Q.85.** Prove that : cos $\dfrac{2\pi}{15}\cos\dfrac{4\pi}{15}\cos\dfrac{8\pi}{15}\cos\dfrac{14\pi}{15}=\dfrac{1}{16}$

**Q.86.** Prove that: tan 4q = $\dfrac{4\tan\theta(1-\tan^2\theta)}{1-6\tan^2\theta+\tan^4\theta}$

**Q.87.** Prove: cos 4 A = 1 – 8 cos2 A+8 cos4 A

**Q.88.** Prove: sin 4 A = 4 sin A cos3 A – 4 cos A sin3 A.

**Q.89.** Prove that: cos 6A = 32 cos6 A – 48 cos4 A + 18 cos2 A – 1

**Q.90.** Prove that : cos A cos (60-A) cos (60+A) = $\dfrac{1}{4}\cos 3A$