QB365 Question Bank Software Study Materials

Trigonometry Important 2 Marks Questions With Answers (Book Back and Creative)

9th Standard

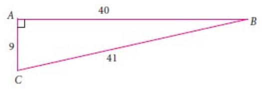
Maths

Total Marks : 60

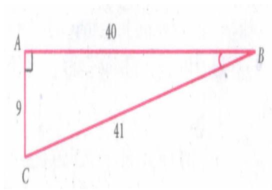
2 Marks

30 x 2 = 60

1) From the given figure, find all the trigonometric ratios of angle B.



Answer :



sin B = $\frac{9}{41}$;

cos B = $\frac{40}{41}$;

tan B = $\frac{9}{40}$;

cosec B = $\frac{1}{sinB}$ = $\frac{41}{9}$;

sec B = $\frac{1}{cotB}$ = $\frac{41}{40}$;

cot B = $\frac{1}{tanB}$ = $\frac{40}{9}$

2) From the given figure, find the values of

(i) sin B

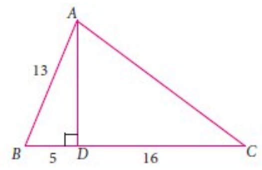
(ii) sec B

(iii) cot B

(iv) cos C

(v) tan C

(vi) cosec C



Answer : (i) $sinB = \frac{12}{13}$

(ii) $secB = \frac{1}{cosB}$

= $\frac{1}{5/3} = \frac{13}{5}$

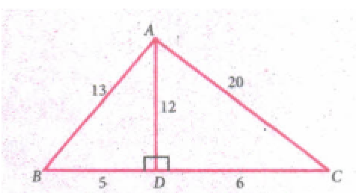
(iii) $cotB = \frac{1}{tanB} = \frac{1}{12/5} = \frac{5}{2}$

(iv)

cos C = $\frac{16}{20} = \frac{4}{5}$

(v) $\tan C = \frac{12}{16} = \frac{3}{4}$

(vi) $cosecC = \frac{1}{sinC} = \frac{1}{12/20} = \frac{20}{12} = \frac{5}{3}$



By the pythagoras theorem,

$AD = \sqrt{13^2 - 5^2}$

= $\sqrt{169 - 25}$

= $\sqrt{144} = 12$

AC = $\sqrt{12^2 + 16^2}$

= $\sqrt{144+256}$

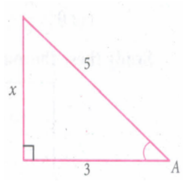
= $\sqrt{400}=20$

3) If cos A = $\frac{3}{5}$, then find the value of $\frac{sinA-cosA}{2tanA}$

Answer : $sinA=\frac{4}{5}$

$$tanA=\frac{4}{3}$$

$$\therefore\ \frac{sinA-cosA}{2tanA}=\frac{\frac{4}{5}-\frac{3}{5}}{2\times\frac{4}{3}}=\frac{\frac{1}{5}}{2\times\frac{4}{3}}=\frac{1}{4}\times\frac{1}{5}\times\frac{3}{4}=\frac{3}{40}$$



By the Pythagoras theorem

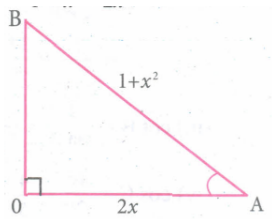
x=$\sqrt{5^2-3^2}$

= $\sqrt{25-9}$

= $\sqrt{16}=4$

4) If cos A = $\frac{2x}{1+x^2}$ then find the values of sinA and tan A in terms of x.

Answer :



By the pythagoras theorem,

AB^2 = OA^2 + OB^2

$(1+x^2)^2 = (2x)^2 + OB^2$

$OB^2 = (1+x^2)^2 - (2x)^2 = 1+x^4+2x^2-4x^2 = 1+x^4-2x^2$

$OB^2 = (1-x^2)^2$ B

OB = $(1-x^2)$

$$\therefore\ sin\ A=\frac{1-x^2}{1+x^2}$$

$$tan\ A=\frac{1-x^2}{2x}$$

5) If sin θ = $\frac{a}{\sqrt{a^2+b^2}}$ then show that b sin θ = a cos θ

Answer : $sin\ \theta=\frac{a}{\sqrt{a^2+b^2}}$

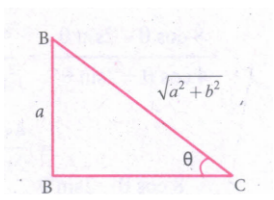
$$cos\ \theta=\frac{b}{\sqrt{a^2+b^2}}$$

$$b\ sin\ \theta=b\times\frac{a}{\sqrt{a^2+b^2}}-\frac{ab}{\sqrt{a^2+b^2}}\qquad ...(1)$$

$$a\ cos\ \theta=a\times\frac{b}{\sqrt{a^2+b^2}}=\frac{ab}{\sqrt{a^2+b^2}}\qquad ...(2)$$

(1) = (2)$\Rightarrow$ LHS = RHS

Hence proved



By By the Pythagoras theorem

$BC^2 = AC^2 + AB^2$

= $\left(\sqrt{a^2+b^2}\right)^2-a^2$

= $a^2+b^2-a^2$

= b^2

BC = b

6) If 3 cot A = 2 , then find the value of = $\frac{4\ sin\ A-3\ cos\ A}{2\ sin\ A+3\ cos\ A}$

Answer : $cot\ A = \frac{2}{3}$

$cot\ A = \frac{Adjacent\ side}{Opposite\ side}$

$tan\ A = \frac{Opp.\,side}{Adj.\,side} = \frac{3}{2}$

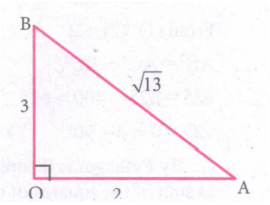
$sin\ A = \frac{3}{\sqrt{13}}$

$cotA = \frac{2}{\sqrt{13}}$

$$\therefore \frac{4sinA - 3cosA}{2ainA + 3cosA} = \frac{4 \times \frac{3}{\sqrt{13}} - 3 \times \frac{2}{\sqrt{13}}}{2 \times \frac{3}{\sqrt{13}} + 3\frac{2}{\sqrt{13}}}$$

$$= \frac{\frac{12}{\sqrt{13}} - \frac{6}{\sqrt{13}}}{\frac{6}{\sqrt{13}} + \frac{6}{\sqrt{13}}} = \frac{\frac{6}{\sqrt{13}}}{\frac{2}{\sqrt{13}}} = \frac{6}{\sqrt{13}} \times \frac{\sqrt{13}}{12}$$

$$= \frac{6}{12} = \frac{1}{2}$$



By Pythagoras theorem In△OAB,

$AB^2 = OA^2 + OB^2$

$= 3^2 + 2^2$

= 9+4

= 13

$AB = \sqrt{13}$

7) If cos θ : sinθ =1: 2, then find the value of = $\frac{8cos\theta - 2sin\theta}{4cos\theta + 2sin\theta}$

Answer : $cos\theta : sin\theta = 1 : 2$

$\frac{cos\theta}{sin\theta} = \frac{1}{2}$

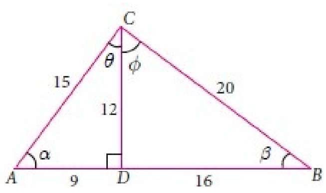
$cos\theta = \frac{1}{2}sin\theta$

$\sin\theta = 2\cos\theta$

$$\therefore \frac{8\cos\theta - 2\sin\theta}{4\cos\theta + 2\sin\theta} = \frac{8 \times \frac{1}{2}\sin\theta - 2\sin\theta}{4 \times \frac{1}{2}\sin\theta + 2\sin\theta} = \frac{4\sin\theta - 2\sin\theta}{2\sin\theta + 2\sin\theta} = \frac{2\sin\theta}{4\sin\theta} = \frac{1}{2}$$

$$\therefore \frac{8cos\theta - 2sin\theta}{4cos\theta + 2sin\theta} = \frac{1}{2}$$

8) From the given figure, prove that $\theta + \phi = 90^\circ$ Also prove that there are two other right angled triangles. Find sin α, cosβ and tanϕ



Answer : In$\triangle$ABC

$AC^2 = 15^2 = 225$- - - - - (1)

$BC^2 = 20^2 = 400$ - - - - (2)

$AB^2 = (9 + 16)^2$

From (1), (2), (3)

$AB^2 = AC^2 + BC^2$

625 = 225 + 400 = 625

$\therefore \angle C = \theta + \Phi = 90^0$

($\therefore$ By Pythagoras theorem, in a right angled triangle square of hypotenuse is equal to sum of the squares of other two side)

And also in the figure. $\triangle$ADC, $\triangle$DBC are two other triangles.

As per the data given,

$9^2 + 12^2 = 81 + 144 = 225 = 15^2$

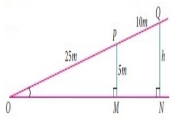
$\therefore$ $\triangle$ADC is a right angled triangle.

then $12^2 + 16^2 = 144 + 256 = 400 = 20^2$

$\therefore$ $\triangle$DBC is also a right angled triangle.

$$sin\alpha = \frac{12}{15} = \frac{4}{5}, cos\beta = \frac{16}{20} = \frac{4}{5}, tan\phi = \frac{16}{12} = \frac{4}{3}$$

9) A boy standing at a point O finds his kite flying at a point P with distance OP = 25 m. It is at a height of 5m from the ground. When the thread is extended by 10 m from P, it reaches a point Q. What will be the height QN of the kite from the ground? (use trigonometric ratios)



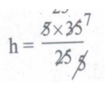
Answer : In the figure,

$\triangle$OPM, $\triangle$OQN are similar triangles. In similar triangles the sides are in the same proportional.

$$\frac{QN}{PM} = \frac{QO}{PO}$$

$$\frac{h}{5} = \frac{35}{25}$$

$$h = \frac{5 \times 35}{25}$$



h = 7m

10) Evaluate:

(i) sin 30^0 +cos 30^0

(ii) tan 60^0 cot 60^0

(iii) $\frac{tan45^\circ}{tan30^\circ + tan60^\circ}$

(iv) $\sin^2 45^0 + \cos^2 45^0$

Answer : (i)sin 30^0 + cos 30^0 = $\frac{1}{2} + \frac{\sqrt{3}}{2} = \frac{1+\sqrt{3}}{2}$

(ii) tan 60^0 cot 60^0 = $\sqrt{3} \times \frac{1}{\sqrt{3}} = 1$

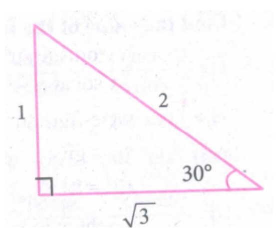
(iii) $\frac{tan45^\circ}{tan30^\circ + tan60^\circ}$ = $\frac{1}{\frac{1}{\sqrt{3}} + \frac{\sqrt{3}}{1}} = \frac{1}{\frac{1+(\sqrt{3})^2}{\sqrt{3}}} = \frac{1}{\frac{1+3}{\sqrt{3}}} = \frac{\sqrt{3}}{4}$

(iv) $\sin^2 45^0 + \cos^2 45^0$ = $\left(\frac{1}{\sqrt{2}}\right)^2 + \left(\frac{1}{\sqrt{2}}\right)^2 = \frac{1^2}{(\sqrt{2})^2} + \frac{1^2}{(\sqrt{2})^2} = \frac{1}{2} + \frac{1}{2} = 1$

11) Verify the following equalities :

$\sin^2 60^0 + \cos^2 60^0 = 1$

Answer :



$$\sin^2\tan^2 + \cos^2 60^o = \left(\frac{\sqrt{3}}{2}\right) + \left(\frac{1}{2}\right)^2 = \frac{3}{4} + \frac{1}{4} = \frac{4}{4} = 1$$

12) Find the value of the following:

(i) $\frac{tan45^\circ}{cosec30^\circ} + \frac{sec60^\circ}{cot45^\circ} - \frac{5sin90^\circ}{2cos0^\circ}$

(ii) (sin 90^0 + cos 60^0 + cos 45^0) $\times$ (sin 30^0 - cos 0^0 +cos 45^0)

(iii) $\sin^2 30^0$ - $2\cos^3 60^0$ + $3\tan^4 45^0$

Answer : (i) $\frac{tan45^\circ}{cosec30^\circ} + \frac{sec60^\circ}{cot45^\circ} - \frac{5sin90^\circ}{2cos0^\circ}$

= $\frac{1}{2} + \frac{2}{1} - \frac{5 \times 1}{2 \times 1}$

= $\frac{1}{2} + \frac{2}{1} - \frac{5 \times 1}{2 \times 1}$

= $\frac{1}{2} + \frac{2}{1} - \frac{5}{2} = \frac{1+4-5}{2} = \frac{5-5}{2} = \frac{0}{2} = 0$

(ii) (sin 90° + cos 60° + cos 45°) $\times$ (sin 30° - cos 0° + cos 45^0)

= $\left(1 + \frac{1}{2} + \frac{1}{\sqrt{2}}\right) \times \left(\frac{1}{2} - 1 + \frac{1}{\sqrt{2}}\right)$

= $\frac{2+1+\sqrt{2}}{2} \times \frac{1-2+\sqrt{2}}{2}$

= $\frac{3+\sqrt{2}}{2} \times \frac{\sqrt{2}-1}{2} = \frac{3\sqrt{2}+2-3-\sqrt{2}}{4}$

= $\frac{3\sqrt{2}-1-\sqrt{2}}{4} = \frac{2\sqrt{2}-1}{4} = \frac{18-4}{8} = \frac{7}{4}$

(iii) $\sin^2 30^0$ - 2 $\cos^3 60^0$ + 3 $\tan^4 45^0$

$= \left(\frac{1}{2}\right)^3 - 2\left(\frac{1}{2}\right)^3 + 3(1)^4 = \frac{1}{4} - \cancel{2}\left(\frac{1}{\cancel{8}}\right) + 3(1) = \frac{\cancel{1}}{\cancel{4}} - \frac{\cancel{1}}{\cancel{4}} + 3 = 3$

13) Find the value of 8 sin 2x cos 4x sin 6x , when x =15^0

Answer : 8 sin 2(15°). cos 4 (15°). sin 6(15°)

= 8 sin 30° cos 60° sin 90°

= $8 \times \frac{1}{2} \times \frac{1}{2} \times 1 = 2$

14) Find the value of the following:

$\left(\frac{cos47^\circ}{sin43^\circ}\right) + \left(\frac{sin72^\circ}{cos18^\circ}\right) - 2\cos^2 45^\circ$

Answer : $\left(\frac{cos47^\circ}{sin43^\circ}\right) + \left(\frac{sin72^\circ}{cos18^\circ}\right) - 2cos^2 45^\circ$

= $\left(\frac{cos\left(90^0 - 43^0\right)}{sin43^0}\right)^2 + \left(\frac{sin\left(90^0 - 18^0\right)}{cos18}\right)^2 - 2cos^0 45^0$

= $\left(\frac{sin43}{sin43}\right)^2 + \left(\frac{cos18}{cos18}\right)^2 - 2\left(\frac{1}{\sqrt{2}}\right)^2$

$= 1^2 + 1^2 - \cancel{2} \times \frac{1}{\cancel{2}} = 2 - 1 = 1$

15) Find the value of the following:

(i) sin 49°

(ii) cos $74^0 39'$

(iii) tan $54^0 26'$

(iv) sin $21^0 21'$

(v) cos $33^0 53'$

(vi) tan $70^0 17'$

Answer :

	0	6'	12'	18'	24'	30'	36'	42'	48'	54'	Mean difference							
	0.00	0.1^0	0.2^0	0.3^0	0.4^0	0.5^0	0.6^0	0.7^0	0.8^0	0.9^0	1	2	3	4	5	6	7	8
49	0.7547																	

(i) sin 49° = 0.7547

(ii) cos 74° 39'

cos 74° 36' = 0.2656 (From the natural cosines table)

Mean difference 3' = 8

cos 74° 39'= 0.2648

(iii) tan 54° 26'

From the natural tangents table

tan 54° 24' = 1.3968

Mean difference 2' = 17

tan 54° 26' = 1.3985

(iv) sin 21°21'

From the natural sines table

sin 21° 18' = 0.3633

Mean difference 3' = 8

sin 21° 18' = 0.3641

(v) cos 33° 53'

From the natural cosines table

cos 33° 48' = 0. 8310

Mean difference 5' = 8

cos 33° 53' = 0.8318

(vi) $\tan 70^o 12'$ = 2.7776

Mean difference for 5'= 131 (Mean diference is to be added)

= 2.7907

16) Find the value of θ if

(i) sin θ = 0.9975

(ii) cos θ = 0.6763

(iii) tan θ = 0.0720

(iv) cos θ = 0.0410

(v) tan θ = 7.5958

Answer : (i) From the natural sines table

sin 85° 57' = 0.9975

$\therefore \theta$ = 85° 57'

(ii) cosθ = 0.6763

cos 47° 33' = 0.6762

$\therefore \theta$ = 47° 33'

(iii) tan θ = 0.0720

tan 4° 7' = 0.0720

$\therefore \theta$ = 4°7'

(iv) cos θ = 0.0410

cos 87° 45° = 0.0410

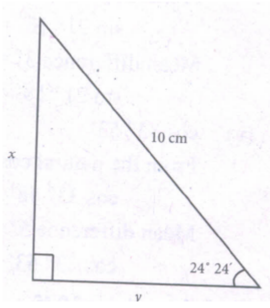
$\because\therefore \theta$ = 87°39'

(v) tan θ = 7.5958

tan 82° 30' = 7.5958

$\therefore \theta$ = 82° 30'

17) Find the area of a right triangle whose hypotenuse is 10cm and one of the acute angle is $24^0 24'$

Answer : 

Hypotenuse = 10 cm

One of the acute angle = 24° 24'

sin 24° 24' = 0.4131'

$$\frac{x}{10} = 0.4131$$

x = 0.4131 × 10

x = 4.131

cos 24° 24' = 0.9107

$$\frac{y}{10} = 0.9107$$

y = 9.107

∴ Area of the triangle = $\frac{1}{2}bh$

= $\frac{1}{2} \times y \times x$

$$= \frac{1}{2} \times 9.107 \times 4.131 = 18.81 sq.cm$$

18) Verify the following equalities :

$1 + \tan^2 30^0 = \sec^2 30^0$

Answer : $1 + \tan^2 30° = \sec 30°$

$1 + \tan^2 30° = 1 + \left(\frac{1}{\sqrt{3}}\right)^2 = 1 + \frac{1}{3} = \frac{3+1}{3} + \frac{4}{3}$

$$sec\ 30^0 = \frac{1}{cos 30} = \frac{1}{\sqrt{3}} = 1 \times \frac{2}{\sqrt{3}} = \frac{2}{\sqrt{3}}$$

$$sec^2 30 = \left(\frac{2}{\sqrt{3}}\right)^2 = \frac{4}{3}$$

(1) = (2) ⇒ LHS = RHS

∴ Hence it is verified

19) Verify the following equalities :

$\cos 90^0 = 1 - 2\sin^2 45^0 = 2\cos^2 45^0 - 1$

Answer : $\cos 90° = 1 - 2 \sin^2 45° = 2 \cos^2 45° - 1$.

cos 90° = 0 - - - - - (1)

$1 - 2\sin^2 45° = 1 - 2 \times \left(\frac{1}{\sqrt{2}}\right)^2 = 1 - \cancel{2} \times \frac{1}{\cancel{2}} = 1 - 1 = 0$ ----------(2)

$$2cos^2 = 2 \times \left(\frac{1}{\sqrt{2}}\right)^2 = 2 \times \frac{1}{2}$$

$2 \cos^2 45° - 1 = 1 - 1 = 0$

(1) = (2) = (3). Hence it is verified.

20) Verify the following equalities :

sin 30°cos 60°+ cos 3°sin 60° = sin 90°

Answer : sin 30° cos 60° + cos 30° sin 60° = sin 90°

$sin\ 30^0 = \frac{1}{2}, sin\ 60^0 = \frac{\sqrt{3}}{2}$

$cos\ 30^0 = \frac{\sqrt{3}}{2}, cos\ 60^0 = \frac{1}{2}$

sin 90° = 1

$\therefore$ sin 30° cos 60°=$\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

cos30° sin60° = $\frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2} = \frac{3}{4}$

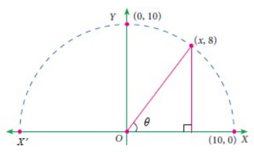
$\therefore$ sin 30° cos 60° + cos 30° sin 60°

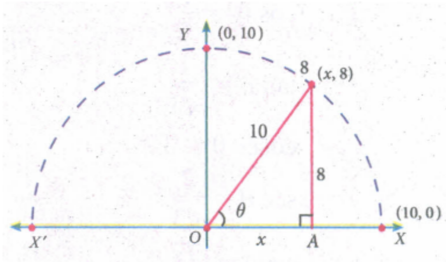
= $\frac{1}{4} + \frac{3}{4} = \frac{4}{4} = 1 = sin^0 90^0$

	0°	**30°**	**45°**	**60°**	**9°**
sin	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
cos	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
tan	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	∞
cosec	0	2	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	1
sec	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	∞
cot	α	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0

Study the above table thoroughly.

21) From the given figure, find all the trigonometric ratios of angle θ



Answer : 

By the Pythagoras theorem

In △OAB, $x=\sqrt{10^2-8^2}=\sqrt{100-64}=\sqrt{36}$

$sin\theta=\frac{8}{10}=\frac{4}{5}$

$cos\theta=\frac{6}{10}=\frac{3}{5}$

$tan\theta=\frac{8}{6}=\frac{4}{3}$

$cosec\theta=\frac{10}{8}=\frac{5}{4}$

$sec\theta=\frac{10}{6}=\frac{5}{3}$

$cot\theta=\frac{6}{8}=\frac{3}{4}$

Study these thoroughly

$sin\theta=\frac{Opp.\,side}{Hypotenuse}$

$cos\theta=\frac{Adj.\,side}{Hypotenuse}$

$tan\theta=\frac{Opp.\,side}{Adj.\,side}$

$cosec\theta=\frac{Hypotenuse}{Opp.\,side}$

$sec\theta=\frac{Hypotenuse}{Opp.\,side}$

$cot\theta=\frac{Adj.\,side}{Opp.\,side}$

22) If 3 cotθ = 1, then find the value of $\frac{3cos\theta-4sin\theta}{5sin\theta+4cos\theta}$

Answer : $cot\theta=1$

$cot\theta=\frac{1}{3}$

$\frac{adjacent}{opposite}=\frac{1}{3}$

$\sqrt{3^2+1}=\sqrt{10}$

$$\frac{3cos\theta-4sin\theta}{5sin\theta+4cos\theta}=\frac{3\times\frac{1}{\sqrt{10}}-4\times\frac{3}{\sqrt{10}}}{5\times\frac{3}{\sqrt{10}}+4\times\frac{1}{\sqrt{10}}}=\frac{3-12}{15+4}=\frac{-9}{19}$$

23) If 3 (tan θ) + 4 (sec θ × sin 6) = 24. Then find all the trigonometric ratios of the angle θ

Answer : 3 tan θ + 4 (sec θ × sinθ) = 24

$3tan\theta+4\left(\frac{1}{cos\theta}\times sin\theta\right)=24$

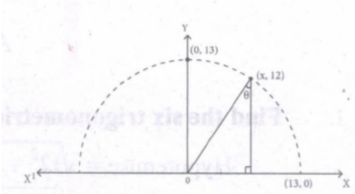
7 tan θ = 24

$tan\theta=\frac{24}{7}$

hypetenuse = $\sqrt{24^2+49}=\sqrt{576+49}=\sqrt{625}=25$

$sin\theta=\frac{24}{25};cos\theta=\frac{7}{25};cosec\theta=\frac{25}{24};sec\theta=\frac{25}{27};cot\theta=\frac{7}{24}$

24) From the given figure, find all the trigonometric ratios of angle θ.



Answer : $x = \sqrt{13^2 - 12^2}$

$\sqrt{169 - 144} = \sqrt{25} = 5$

$sin\theta = \frac{5}{13}; cos\theta = \frac{12}{13}; tan\frac{5}{12}; cosec\theta = \frac{13}{5};$

$sec\theta = \frac{13}{12}; cot\theta = \frac{12}{5}$

25) Find the value of sin 3x. sin 6x. sin 9x when x = 10°

Answer : sin 3 (10°) sin 6 (10°) sin 9 (10°)

= $\frac{1}{2} \times \frac{\sqrt{3}}{2} \times 1 = \frac{\sqrt{3}}{4}$

26) Find the value of $\frac{\tan 25^\circ}{\cot 65^\circ} + \frac{\sin 40^\circ}{\cos 50^\circ}$

Answer : $\frac{\tan 25^\circ}{\cot 65^\circ} + \frac{\sin 40^\circ}{\cos 50^\circ}$

$= \frac{\tan(90^\circ - 65^\circ)}{\cot 65^\circ} + \frac{\sin(90^\circ - 50^\circ)}{\cos 50^\circ}$

$= \frac{\cot 65^\circ}{\cot 65^\circ} + \frac{\cos 50^\circ}{\cos 50^\circ} = 1 + 1 = 2$

27) Given that $sin\alpha = \frac{1}{\sqrt{2}}$ and $tan\beta = \sqrt{3}$ Find the value of $\alpha + \beta$

Answer : $\alpha = sin^{-1}\left(\frac{1}{\sqrt{2}}\right) = 45^0$

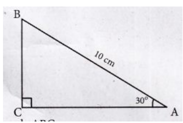
β = 60^0

$\alpha + \beta = 105^0$

28) Find the value of $\frac{cos 63^0 20'}{sin 26^0 40'}$

Answer : $\frac{cos 63^0 20'}{sin 26^0 40'} = \frac{cos 63^0 20'}{cos 63^0 20'} = 1$

29) In right triangle ABC in which $\angle C$ = 90°, $\angle A$ = 30° and $\angle B$ = 10 cm. Find BC

Answer : 

In right triangle ABC

$\sin 30^\circ = \frac{\text{Opposite Side}}{\text{Hypotenuse}}$

$\sin 30^\circ = \frac{\text{BC}}{\text{AB}}$

$\frac{1}{2} = \frac{\text{BC}}{10}$

$\text{BC} = \frac{10}{2} = 5 \text{ cm}$

30) Find the value of $\left(\frac{\sin 39^\circ}{\cos 51^\circ}\right)^2 + \left(\frac{\cos 51^\circ}{\sin 39^\circ}\right)^2$

Answer : $\left(\frac{\sin 39^\circ}{\cos 51^\circ}\right)^2 = \frac{\sin(90^\circ - 51^\circ)}{\cos 51^\circ}$

$= \frac{\cos 51^\circ}{\cos 51^\circ} = 1$

$\frac{\cos 51^\circ}{\sin 39^\circ} = \frac{\cos(90^\circ - 39^\circ)}{\sin 39^\circ}$

$\left(\frac{\sin 39^\circ}{\cos 51^\circ}\right)^2 + \left(\frac{\cos 51^\circ}{\sin 39^\circ}\right)^2 = \frac{\sin 39^\circ}{\sin 39^\circ} = 1$