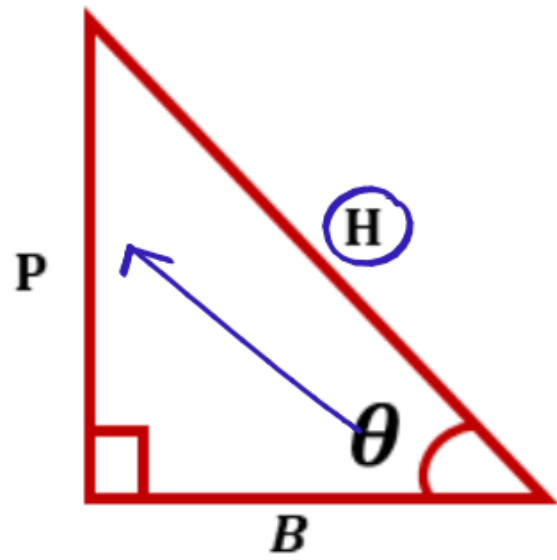


Trigonometric Ratio :-



$$\sin \theta = \frac{P(\text{लम्ब})}{H(\text{कर्ण})}$$

$$\cos \theta = \frac{B(\text{आधार})}{H(\text{कर्ण})}$$

$$\tan \theta = \frac{P(\text{लम्ब})}{B(\text{आधार})}$$

$$\operatorname{cosec} \theta = \frac{H(\text{कर्ण})}{P(\text{लम्ब})}$$

$$\sec \theta = \frac{H(\text{कर्ण})}{B(\text{आधार})}$$

$$\cot \theta = \frac{B(\text{आधार})}{P(\text{लम्ब})}$$

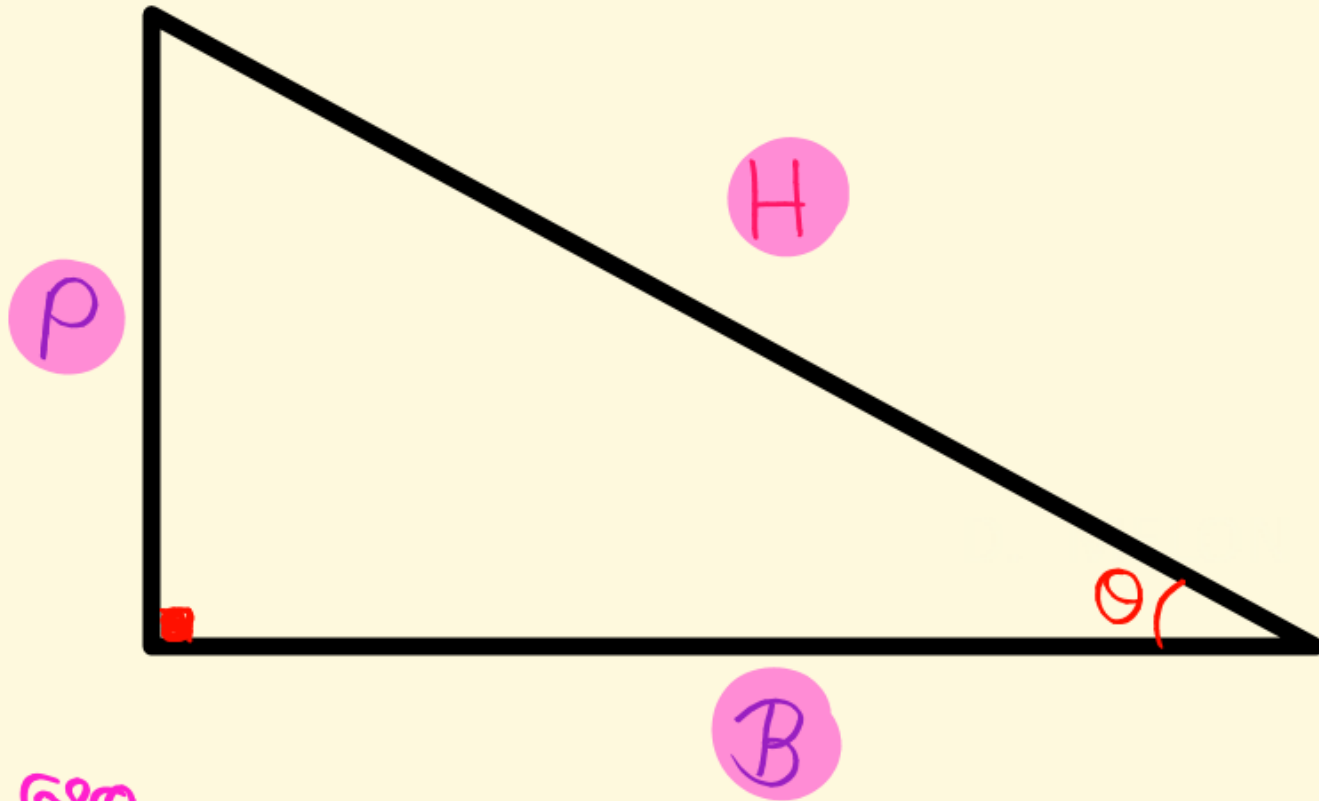
$$\left\{ \begin{array}{l} \sin \theta = \frac{1}{\operatorname{cosec} \theta} \\ \text{या} \\ \operatorname{cosec} \theta = \frac{1}{\sin \theta} \end{array} \right. \longrightarrow \sin \theta \times \operatorname{cosec} \theta = 1$$

$$\sec \theta = \frac{1}{\cos \theta} \longrightarrow \cos \theta \times \sec \theta = 1$$

$$\cot \theta = \frac{1}{\tan \theta} \longrightarrow \tan \theta \times \cot \theta = 1$$

$$\tan \theta = \frac{\sin \theta}{\cos \theta} = \frac{\sec \theta}{\operatorname{cosec} \theta}$$

$$\cot \theta = \frac{\cos \theta}{\sin \theta} = \frac{\operatorname{cosec} \theta}{\sec \theta}$$



	$\cos \theta$	
$\frac{P}{H}$	$\frac{B}{H}$	$\frac{P}{B}$
$\sin \theta$		$\tan \theta$

$$\sin \theta \times \sec \theta = 1$$

$$\cos \theta \times \sec \theta = 1$$

$$\tan \theta \times \cot \theta = 1$$

$$\frac{P}{H} = \sin \theta, \quad \frac{H}{P} = \sec \theta$$

$$\frac{B}{H} = \cos \theta, \quad \frac{H}{B} = \sec \theta$$

$$\frac{P}{B} = \tan \theta, \quad \frac{B}{P} = \cot \theta$$


$$\tan \theta = \frac{p}{B} = \frac{\left(\frac{p}{H}\right)}{\left(\frac{B}{H}\right)} = \frac{\cancel{H} \sin \theta}{\cancel{H} \cos \theta} = \frac{\sin \theta}{\cos \theta}$$

$$\cot \theta = \frac{B}{p} = \frac{\cancel{H} \cos \theta}{\cancel{H} \sin \theta} = \frac{\cos \theta}{\sin \theta}$$



1. A ladder 13 m long leans against a wall. The foot of the ladder is 5 m from the wall. What is $\sin \theta$, where θ is the angle between the ladder and the ground?

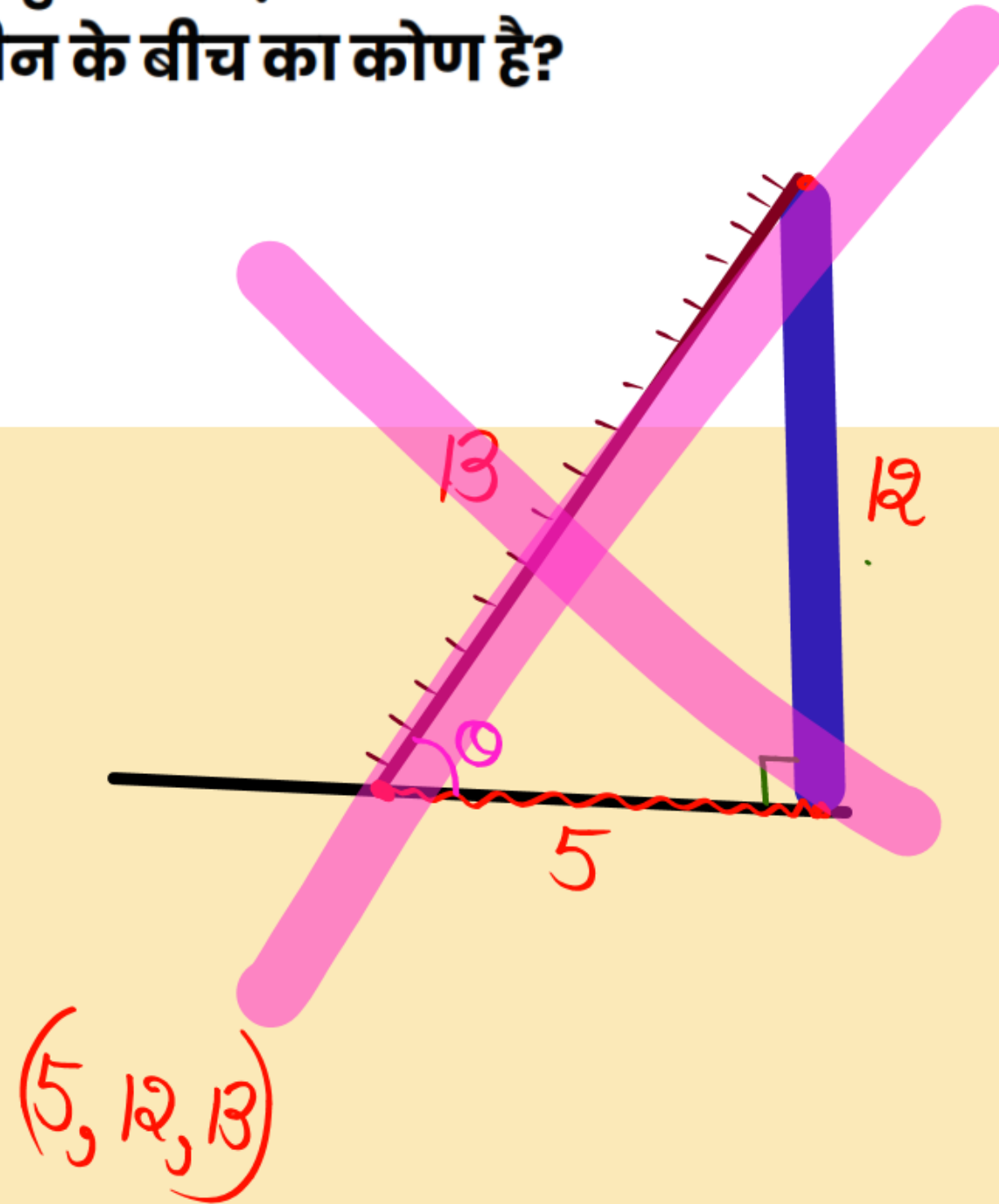
13 m लंबी एक सीढ़ी एक दीवार के सहारे टिकी हुई है। सीढ़ी का निचला सिरा दीवार से 5 m की दूरी पर है। $\sin \theta$ का मान क्या है, जहाँ θ सीढ़ी और ज़मीन के बीच का कोण है?

(SSC CHSL MAINS 2025)

[A] $\frac{5}{13}$
[C] $\frac{13}{5}$

[B] $\frac{12}{13}$
[D] $\frac{12}{5}$

~~$\sin \theta = \frac{P}{H} = \frac{12}{13}$~~



2. In a right-angled triangle, if the lengths of the opposite side and the adjacent side to angle θ are 7 cm and 21 cm, respectively, then what is the value of $\tan\theta$?

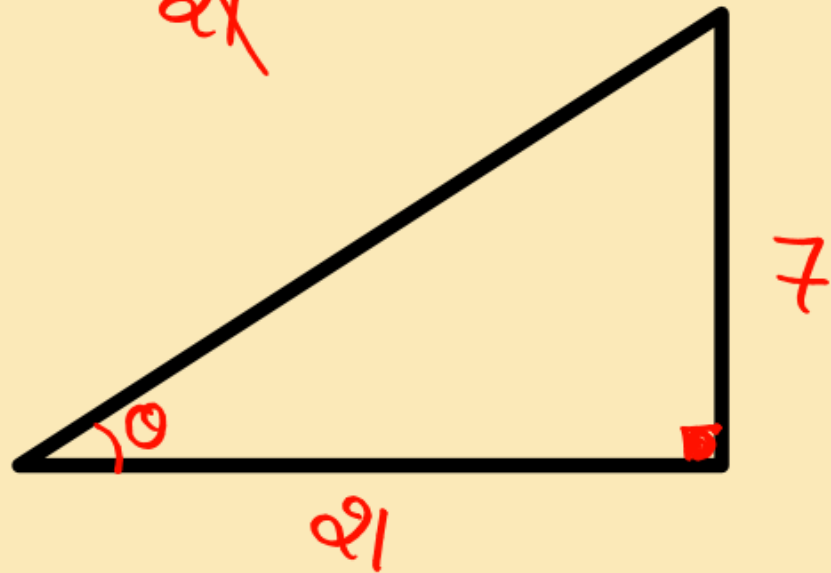
एक समकोण त्रिभुज में, यदि कोण θ की सम्मुख भुजा और उसकी आसन्न भुजा की लंबाई क्रमशः 7 cm और 21 cm है, तो $\tan\theta$ का मान कितना होगा?

(RRB NTPC GRADUATE LEVEL CBT-1 2025)

[A] $\frac{1}{3}$
[C] $\frac{2}{21}$

[B] $\frac{1}{7}$
[D] $\frac{1}{21}$

$\tan\theta = \frac{7}{21}$



3. If $\operatorname{cosec} \theta = \frac{41}{9}$ and θ is an acute angle, then the value of $5 \tan \theta$ will be:
 यदि $\operatorname{cosec} \theta = \frac{41}{9}$ है और θ एक न्यून कोण है, तो $5 \tan \theta$ का मान होगा:

(SSC CGL PRE 2023)

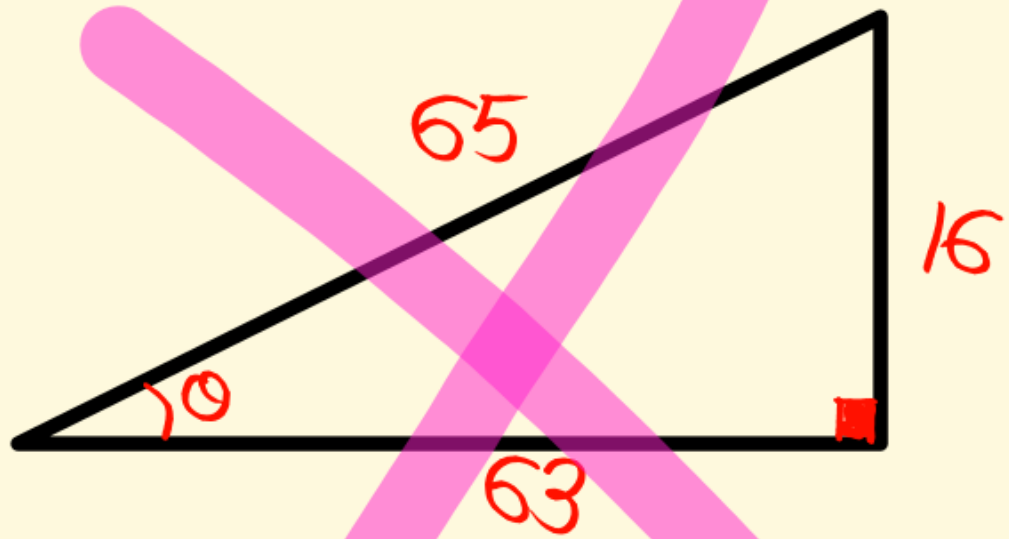
- [A] $\frac{11}{8}$ ✗
 [C] $\frac{7}{8}$ ✗

- [B] $\frac{12}{4}$ ✗
 [D] $\frac{9}{8}$ ✓

$$= 5 \times \frac{9}{40} = \frac{45}{8}$$

$$\begin{aligned} \operatorname{cosec} \theta &= \frac{41}{9} \rightarrow H \\ &\quad 9 \rightarrow p \\ 40 &\rightarrow B \end{aligned}$$

यदि $\sin \theta = \frac{16}{65} \rightarrow P$
 $\rightarrow H$
 $63 \rightarrow B$



(16, 63, 65)

$$\cos \theta = \frac{63}{65}$$

$$\tan \theta = \frac{16}{63}$$

$$\sec \theta = \frac{65}{16}$$

$$\cot \theta = \frac{63}{16}$$

4. If t is an acute angle and $\tan(t) = \frac{3}{7}$, then what is the value of $\operatorname{cosec}(t)$?
 यदि t एक न्यूनकोण है और $\tan(t) = \frac{3}{7}$ है, तो $\operatorname{cosec}(t)$ का मान क्या है?

SSC CHSL PRE 2024

[A] $\frac{\sqrt{53}}{7}$

[C] $\frac{7}{\sqrt{58}}$

[B] $\frac{\sqrt{53}}{3}$

[D] $\frac{\sqrt{58}}{3}$ ✓

$\frac{H}{P} = \frac{\sqrt{58}}{3}$

$$\tan(t) = \frac{3}{7} \rightarrow \begin{matrix} P \\ B \end{matrix}$$

$$H = \sqrt{3^2 + 7^2} = \sqrt{58}$$

5. If $\cot \theta = \frac{14}{3}$, then what is the value of $\cos \theta$? ($0^\circ < \theta < 90^\circ$)

यदि $\cot \theta = \frac{14}{3}$, तो $\cos \theta$ का मान ज्ञात कीजिए। ($0^\circ < \theta < 90^\circ$)

(RRB GROUP-D 2025)

$$\frac{14}{\sqrt{205}}$$

[A] $\frac{3}{\sqrt{205}}$

[B] $\frac{14}{\sqrt{205}}$

[C] $\frac{1}{7}$

[D] $\frac{3}{14}$

$$H = \sqrt{14^2 + 3^2} = \sqrt{205}$$

6. If θ is an acute angle and $\cos \theta = \frac{11}{17}$, what is the value of $\tan \theta$?
 यदि θ एक न्यूनकोण है और $\cos \theta = \frac{11}{17}$, तो $\tan \theta$ का मान क्या है?

SSC CHSL 2023 PRE

[A] $\frac{13}{11}$
 [C] $\frac{2\sqrt{10}}{11}$

[B] $\frac{2\sqrt{42}}{17}$
 [D] $\frac{2\sqrt{42}}{11}$ ✓

$= \frac{2\sqrt{42}}{11}$

$a^2 - b^2 = (a-b) \cdot (a+b)$

$\cos \theta = \frac{11}{17} \leftarrow B$
 $17 \leftarrow H$

$P = \sqrt{H^2 - B^2} = \sqrt{17^2 - 11^2} = \sqrt{6 \times 28} = 2\sqrt{42}$

7. If $\cos A = \frac{1}{11}$, then find the value of $\cot A$.
 यदि $\cos A = \frac{1}{11}$ है, तो $\cot A$ का मान ज्ञात कीजिए।
 (SSC CPO 2023)

$$\frac{1}{\sqrt{11^2 - 1^2}} = \frac{1}{\sqrt{120}}$$

[A] $\frac{2\sqrt{30}}{11}$

[B] $2\sqrt{30}$

[C] $\frac{11}{2\sqrt{30}}$

[D] $\frac{1}{2\sqrt{30}}$ ✓

8. If $\sin\theta = \frac{3}{5}$, then find $\cos\theta + \tan\theta$.

यदि $\sin\theta = \frac{3}{5}$ है, तो $\cos\theta + \tan\theta$ का मान ज्ञात करें।

(SSC CHSL Mains 2025)

[A] $\frac{9}{4}$
[C] $\frac{4}{3}$

[B] $\frac{31}{20}$
[D] $\frac{3}{4}$

$$\frac{4}{5} + \frac{3}{4} = \frac{31}{20}$$

$$\sin\theta = \frac{3}{5} \rightarrow \begin{matrix} P \\ H \end{matrix}$$

$$4 \rightarrow B$$

9. If $\sin\theta = \frac{11}{12}$, then find $\tan\theta + \sec\theta$?

यदि $\sin\theta = \frac{11}{12}$, तो $\tan\theta + \sec\theta$ ज्ञात कीजिए?

SSC CHSL PRE 2024

[A] $\sqrt{23}$

[B] $11/\sqrt{23}$

[C] $12/\sqrt{23}$

[D] 23

$$B = \sqrt{12^2 - 11^2} = \sqrt{23}$$

$$\sec = \sqrt{1 + \tan^2}$$

$$\begin{aligned} & \frac{11}{\sqrt{23}} + \frac{12}{\sqrt{23}} \\ &= \frac{23}{\sqrt{23}} = \sqrt{23} \end{aligned}$$

10. If $5\cos\theta = 4\sin\theta$, $0^\circ \leq \theta \leq 90^\circ$, then what will be the value of $\sec\theta$.

यदि $5\cos\theta = 4\sin\theta$, $0^\circ \leq \theta \leq 90^\circ$ है, तो $\sec\theta$ का मान ज्ञात करें।

SSC CHSL 2023 PRE

[a] $\frac{\sqrt{41}}{5}$

[c] $\frac{\sqrt{41}}{16}$

[B] $\frac{3}{5}$

[D] $\frac{\sqrt{41}}{4}$

$\frac{\sqrt{5^2 + 4^2}}{4}$

$\frac{\cos\theta}{\sin\theta} = \frac{4}{5}$

$\cot\theta = \frac{4}{5} \rightarrow B$



11. If $\sin A = \frac{8}{17}$, then what is the value of $\cot A + \sec A$?

यदि $\sin A = \frac{8}{17}$ है, तो $\cot A + \sec A$ का मान क्या है?

[A] $4\frac{1}{120}$

[C] $5\frac{1}{120}$

15 → 3

[B] $2\frac{1}{120}$

✓ [D] $3\frac{1}{120}$

$$= \frac{15}{8} + \frac{17}{15} = \frac{361}{120} = 3\frac{1}{120}$$

12. If $12\sin\theta = 5\cos\theta$, then $\sin\theta + \cos\theta - \cot\theta$ is equal to:

यदि $12\sin\theta = 5\cos\theta$ है, तो $\sin\theta + \cos\theta - \cot\theta$ का मान है-

SSC CHSL PRE 2023

[A] $\frac{139}{156}$
 [C] $\frac{116}{156}$

[B] $-\frac{71}{65}$
 [D] $-\frac{16}{65}$

$$\frac{5}{13} + \frac{12}{13} - \frac{12}{5} = \frac{17}{13} - \frac{12}{5} = \frac{85-156}{65}$$

$$= -\frac{71}{65}$$

$$\frac{\sin\theta}{\cos\theta} = \frac{5}{12}$$

$$\tan\theta = \frac{5}{12} \rightarrow P$$

$$12 \rightarrow H$$

13. If $\frac{\sin\theta}{x} = \frac{\cos\theta}{y}$, then $\sin\theta - \cos\theta$ is:

यदि $\frac{\sin\theta}{x} = \frac{\cos\theta}{y}$ है, तो $\sin\theta - \cos\theta$ क्या होगा?

(SSC CGL MAINS 2025)

[a] $\frac{x-y}{\sqrt{x^2+y^2}}$

[c] $\frac{x-y}{\sqrt{x^2+y^2}}$

$\frac{x}{\sqrt{x^2+y^2}} - \frac{y}{\sqrt{x^2+y^2}}$

[b] $\frac{x-y}{\sqrt{3x^2+5y^2}}$

[d] $\frac{5x-y}{\sqrt{x^2+y^2}}$

$$\frac{\sin\theta}{\cos\theta} = \frac{x}{y}$$

$$\tan\theta = \frac{x}{y} \rightarrow \frac{P}{B}$$

$$H = \sqrt{x^2+y^2}$$