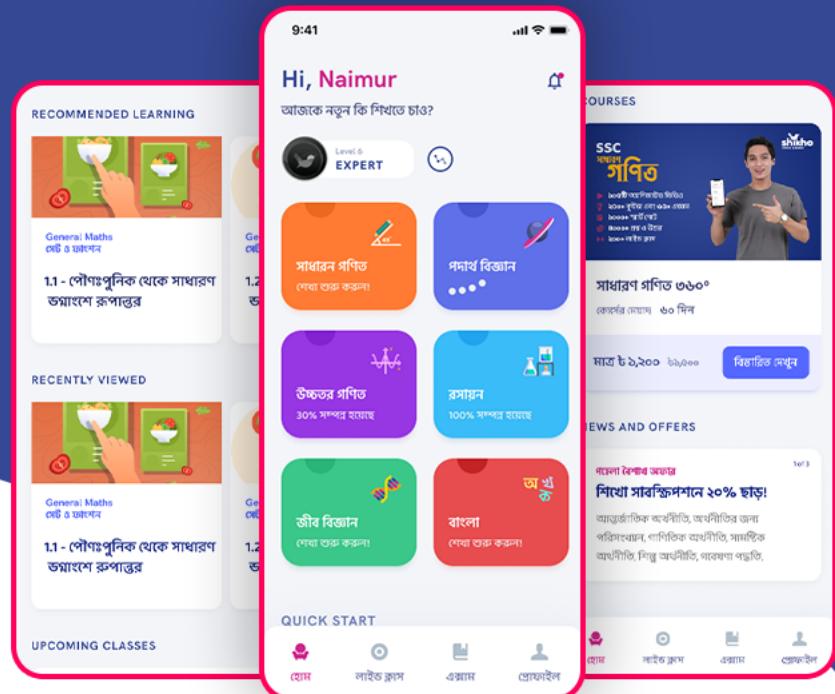


HSC মন্দার্থবিজ্ঞান ১ম পত্র

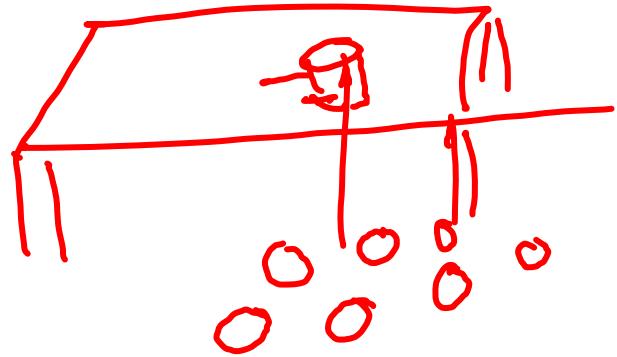
অধ্যায় ২: ডেক্টের পর্ব: ৩



আজকে আমরা যা শিখবো

- নদী পারাপার সংক্রান্ত সমস্যা
- সামাজিক সূত্র সংক্রান্ত সমস্যা
- সৃজনশীল সমস্যার সমাধান

ଶିଖୋ:



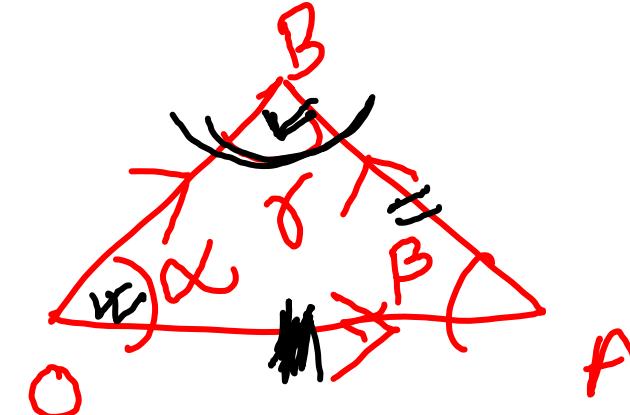
* ଲାଇଫ୍ ରୁକ୍ଷରେ
ବର୍ତ୍ତମାନ ଶିଖୋ

LIVE

ସୀଟ ଦିନୀ ୨୧୩୧

Math 2nd - Chap - 8.

ଠର୍ମ ଉପରେ ତଥା;



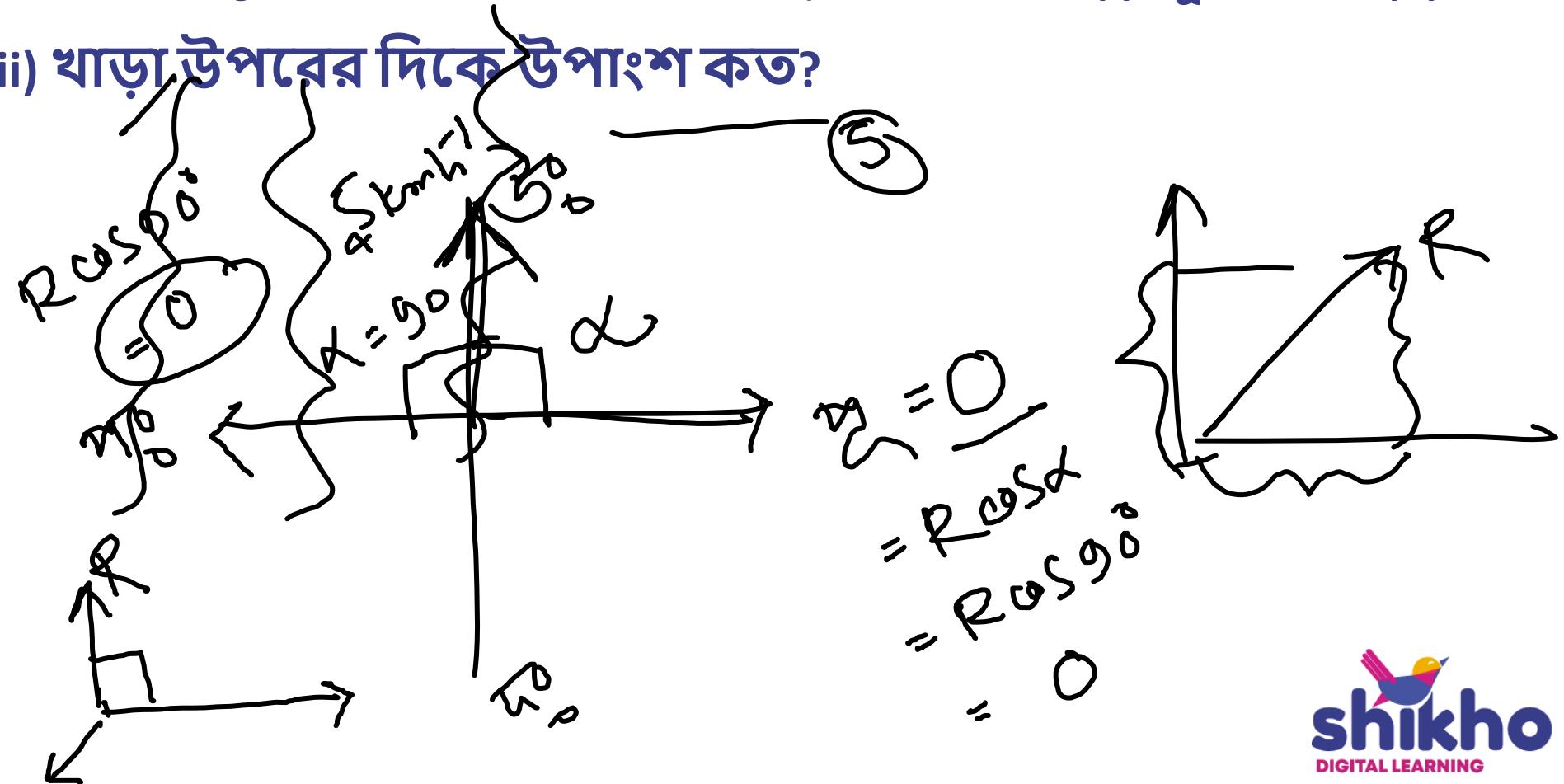
$$\frac{OA}{\sin \gamma} = \frac{AB}{\sin \alpha} = \frac{OB}{\sin \beta}$$



Poll Question - 1

বায়ু ভূমির সমান্তরালে উত্তর দিকে 5 km/hr বেগে প্রবাহিত হলে (i) পূর্বদিকে, (ii) পশ্চিম দিকে, (iii) খাড়া উপরের দিকে উপাংশ কত?

- a) $0,0,5$
- b) $5,0,0$
- c) $5,5,0$
- d) $0,0,0$



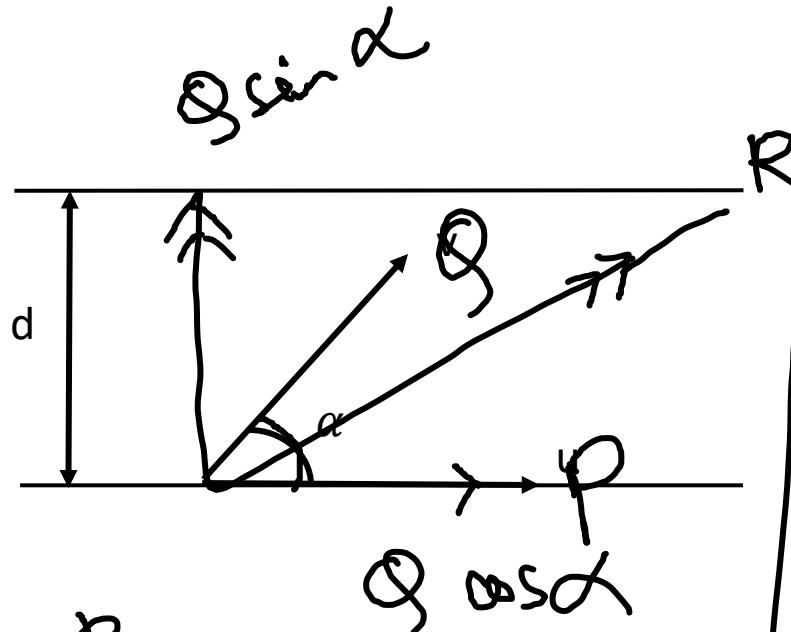
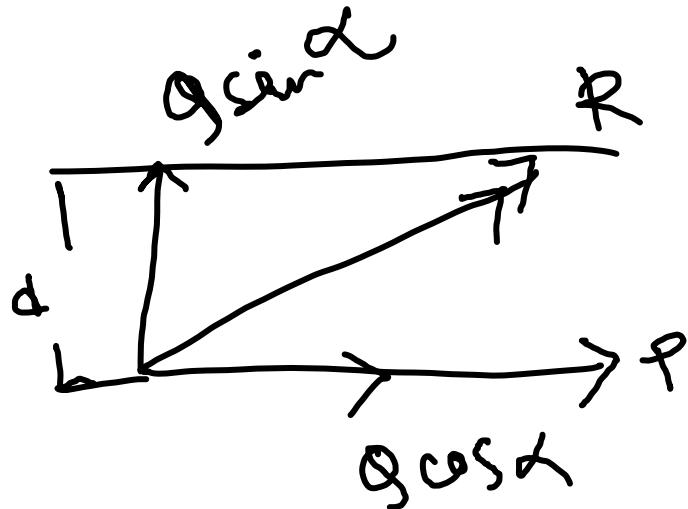
LIVE

সর্বনিম্ন সময়ে নদী পারাপার

স্ন্যোতের বেগ = u

নেকার বেগ = v

নদীর প্রস্থ = d



Case : 1
কোন দিকে/কোথা থেকে
 $\Rightarrow \alpha = \theta_{wes} - \theta_{tan}$

Case : 2
কোথা থেকে রেখা কোথা?

$$R = \sqrt{P^2 + Q^2 + 2PQ \cos(\theta_{tan} - \theta_{wes})}$$

LIVE

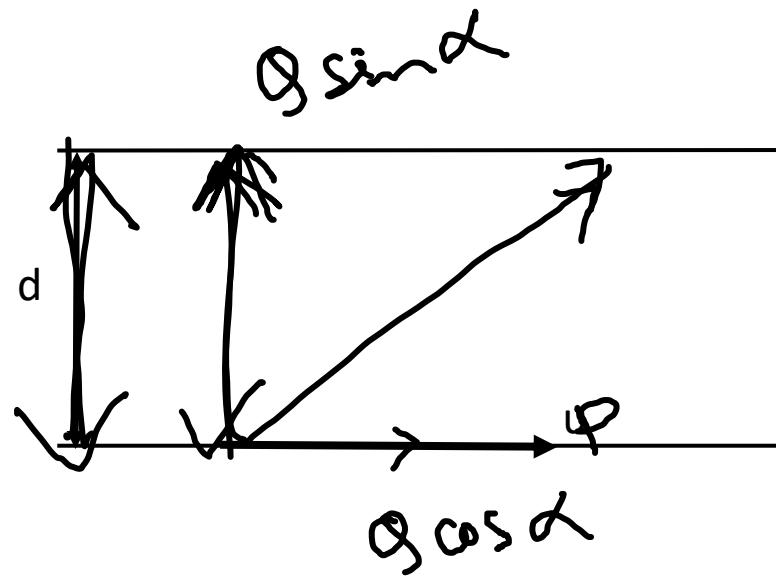
সর্বনিম্ন সময়ে নদী পারাপার

গুরুত্ব: ৩

প্রয়োজন:

$$S = \sqrt{t}$$

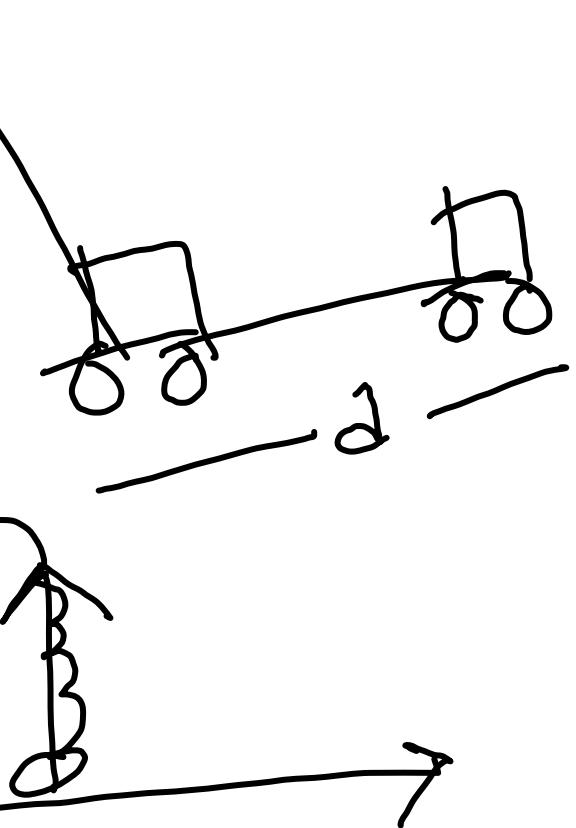
$$\Rightarrow d = \theta \sin \alpha t$$



$$\therefore t = \frac{d}{\theta \sin \alpha}$$

বৃক্ষ পর্যবেক্ষণ
২০১৮ সাল
২০১৭ সাল
 $\alpha = 90^\circ$

$$t_{\min} = \frac{d}{\theta}$$



LIVE

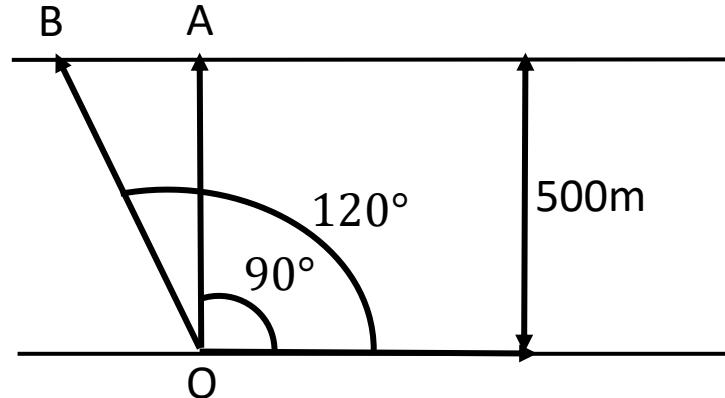
CQ Solving

স্ন্যোতের বেগ = 1 m/s

OB বরাবর করিমের বেগ = 2
m/s

OA বরাবর রহিমের বেগ = 7.5
m/s

গ) করিম কত বেগে অপর পাড়ে পৌছাল? নির্ণয় কর।



• LIVE

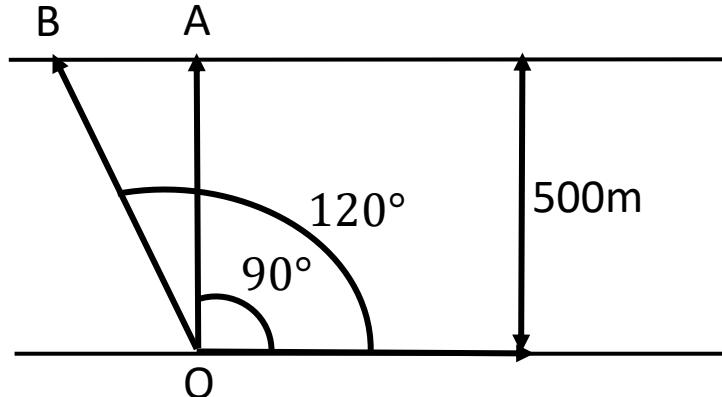
CQ Solving

স্ন্যোতের বেগ = 1 m/s

OB বরাবর করিমের বেগ = 2
m/s

OA বরাবর রহিমের বেগ = 7.5
m/s

ঘ) রহিম ও করিমের মধ্যে কে আগে অপর পাড়ে পৌছবে? গাণিতিক বিশ্লেষণসহ মতামত দাও।



• LIVE

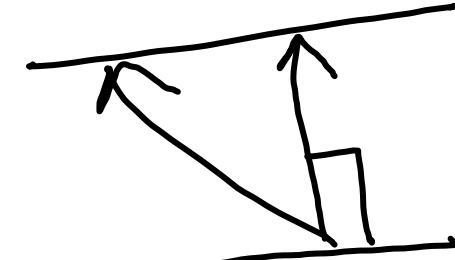
Poll Question - 2

দু'টি ভেক্টরের বৃহত্তম ও ক্ষুদ্রতম লক্ষণান্তর মধ্যে 10° ও 2° একক।
ভেক্টরদ্঵য়কে কোন বিন্দুতে 60° কোণে ক্রিয়াকরণ লেন লক্ষণান্তর?

- a) 6.732
- b) 8.718
- c) 9.101
- d) 8.987

• LIVE

Poll Question - 3



4 km/hr বেগে প্রবাহিত নদী সোজাসুজি পাড়ি দিতে একটি নৌকার কত সময় লাগবে? [যখন নৌকার বেগ 5km/hr নদীর প্রস্থ 1000m] $\Rightarrow 1 \text{ Km}$

- a) $1/(\sqrt{41}) \text{ hr}$
- b) $\sqrt{40} \text{ hr}$
- c) 0.9 hr
- d) ~~$1/3 \text{ hr}$~~

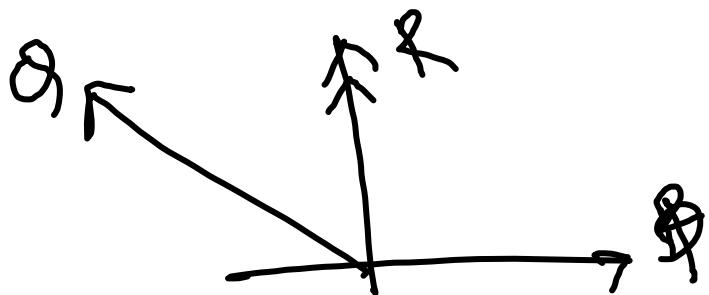
$$\frac{d}{\sqrt{g^2 - v^2}} = t$$

$$t = \frac{1}{\sqrt{9}}$$

$$t = \frac{1}{3} \text{ hr}$$

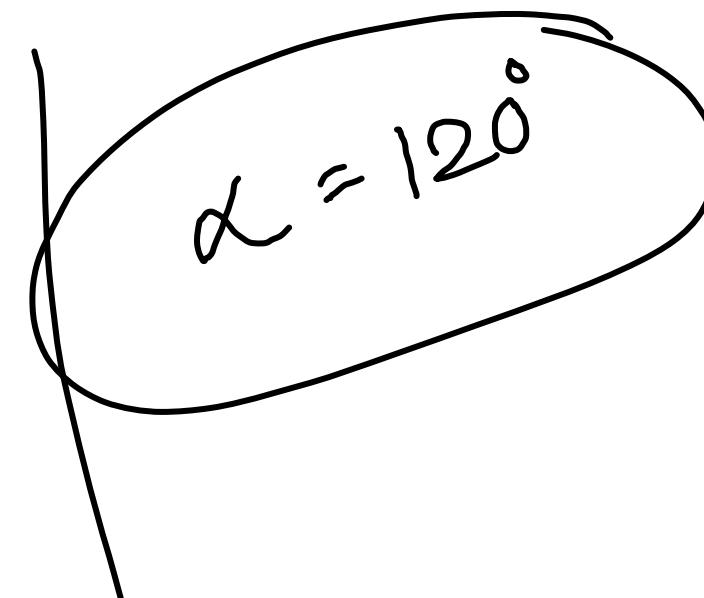
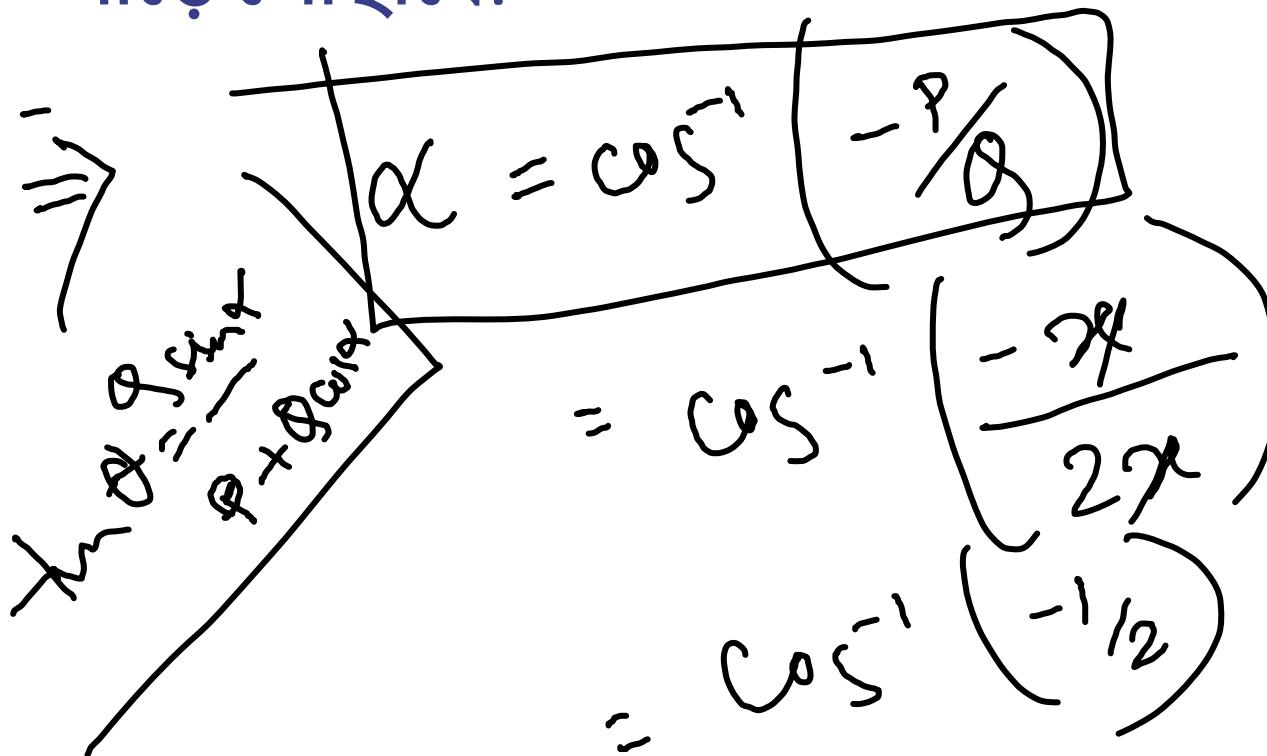
$$\Rightarrow t = \frac{1}{\sqrt{25 - 16}} \text{ hr}$$

Poll Question - 4



$$\alpha = 120^\circ$$

একটি নদীতে স্রোতের বেগ $x \text{ km/hr}$, যদি একটি নৌকাকে $2x \text{ km/hr}$ বেগে চালনা করা হয়, তবে নৌকাটিকে স্রোতের সাথে কত কোণে চালালে তা সোজাসুজি অপর পাড়ে পৌছাবে?

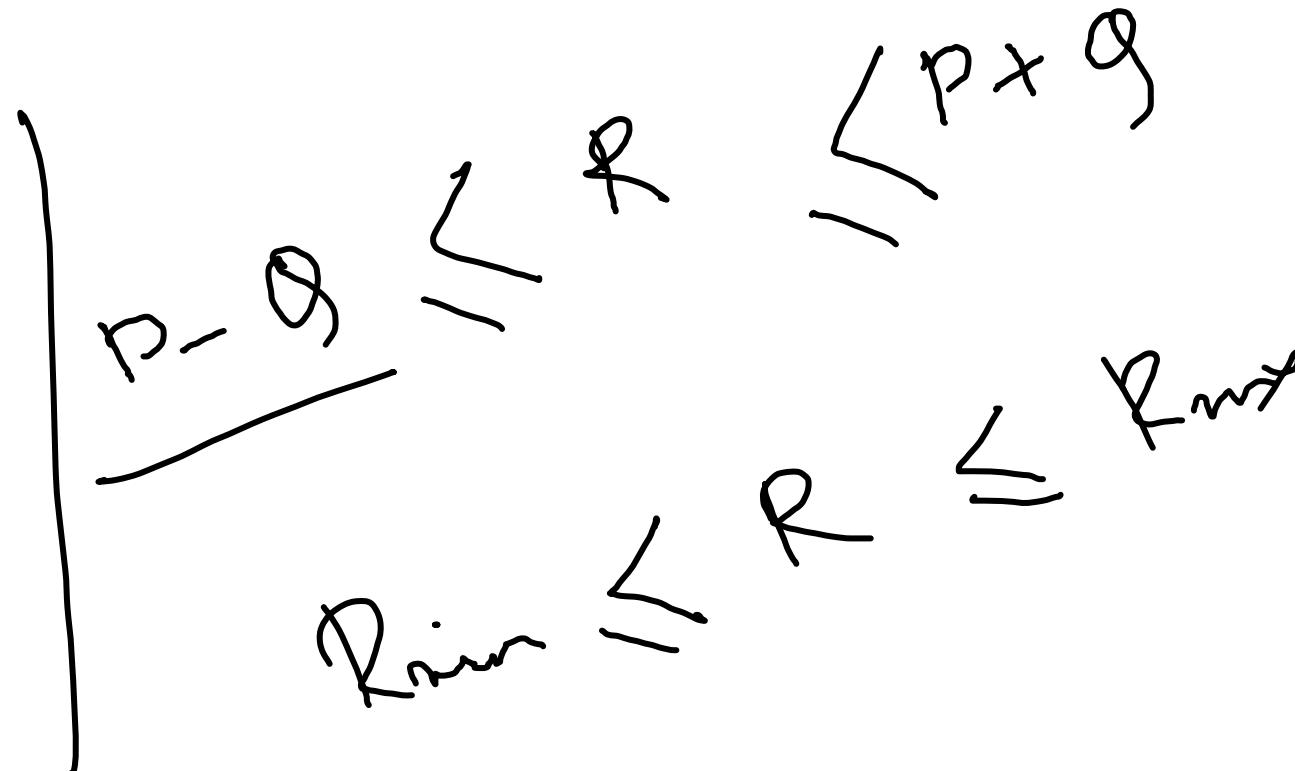


LIVE

Poll Question - 5

দুটি ভেক্টর \vec{P} ও \vec{Q} এর লম্ব \vec{R} এর মান -

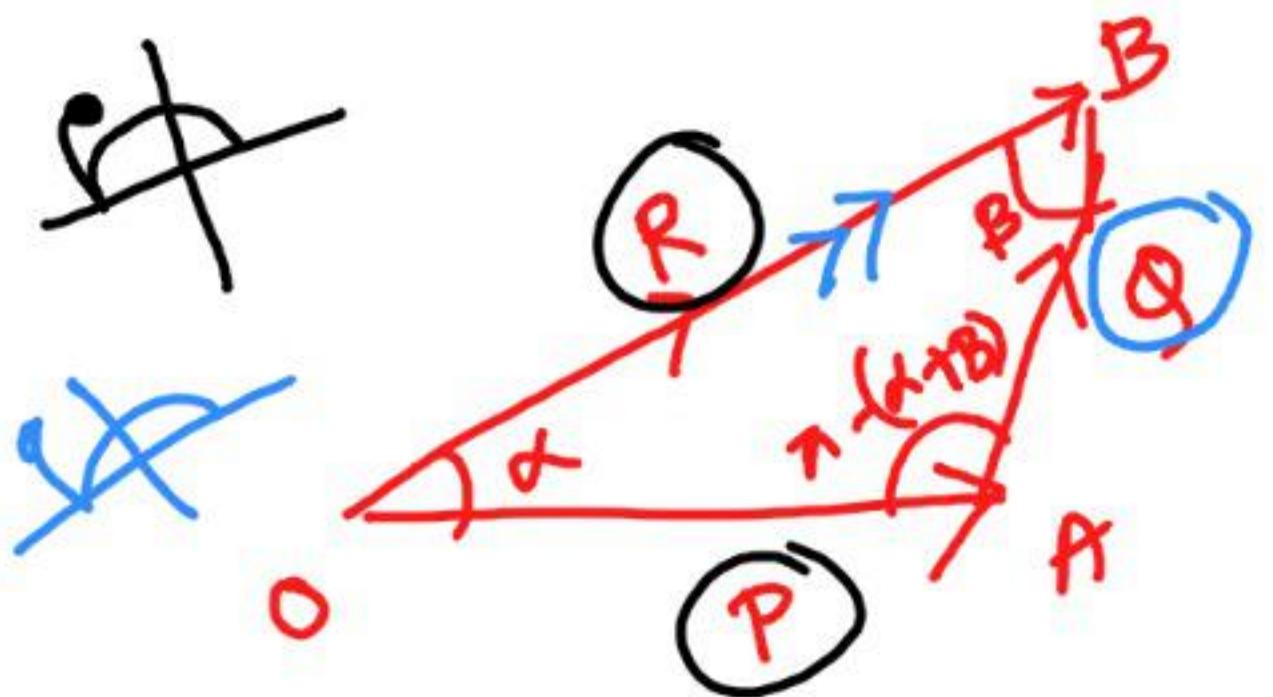
- a) সর্বদা $R > P + Q$
- b) ~~সর্বদা~~ $R < P + Q$
- c) ~~সর্বদা~~ $R = P \sim Q$
- d) $P \sim Q \leq R \leq P + Q$



• LIVE

ANY QUESTION





$$\frac{OA}{\sin \beta} = \frac{OB}{\sin(\pi - (\alpha + \beta))} = \frac{AB}{\sin \alpha}$$

$$\frac{P}{\sin \beta} = \frac{R}{\sin(\alpha + \beta)} = \frac{Q}{\sin \alpha}$$

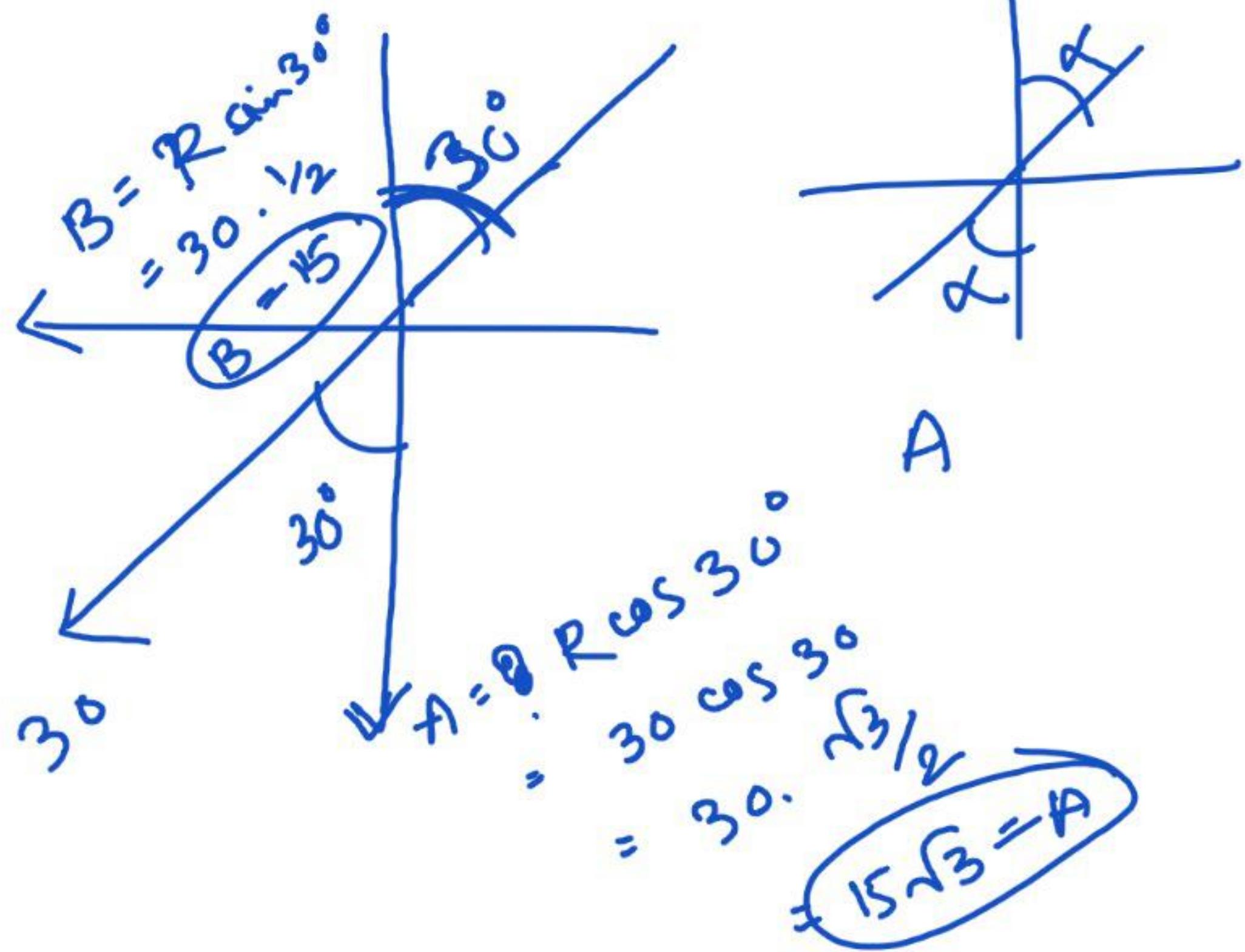
~~$\frac{P}{\sin \beta} = \frac{R}{\sin(\alpha + \beta)}$~~

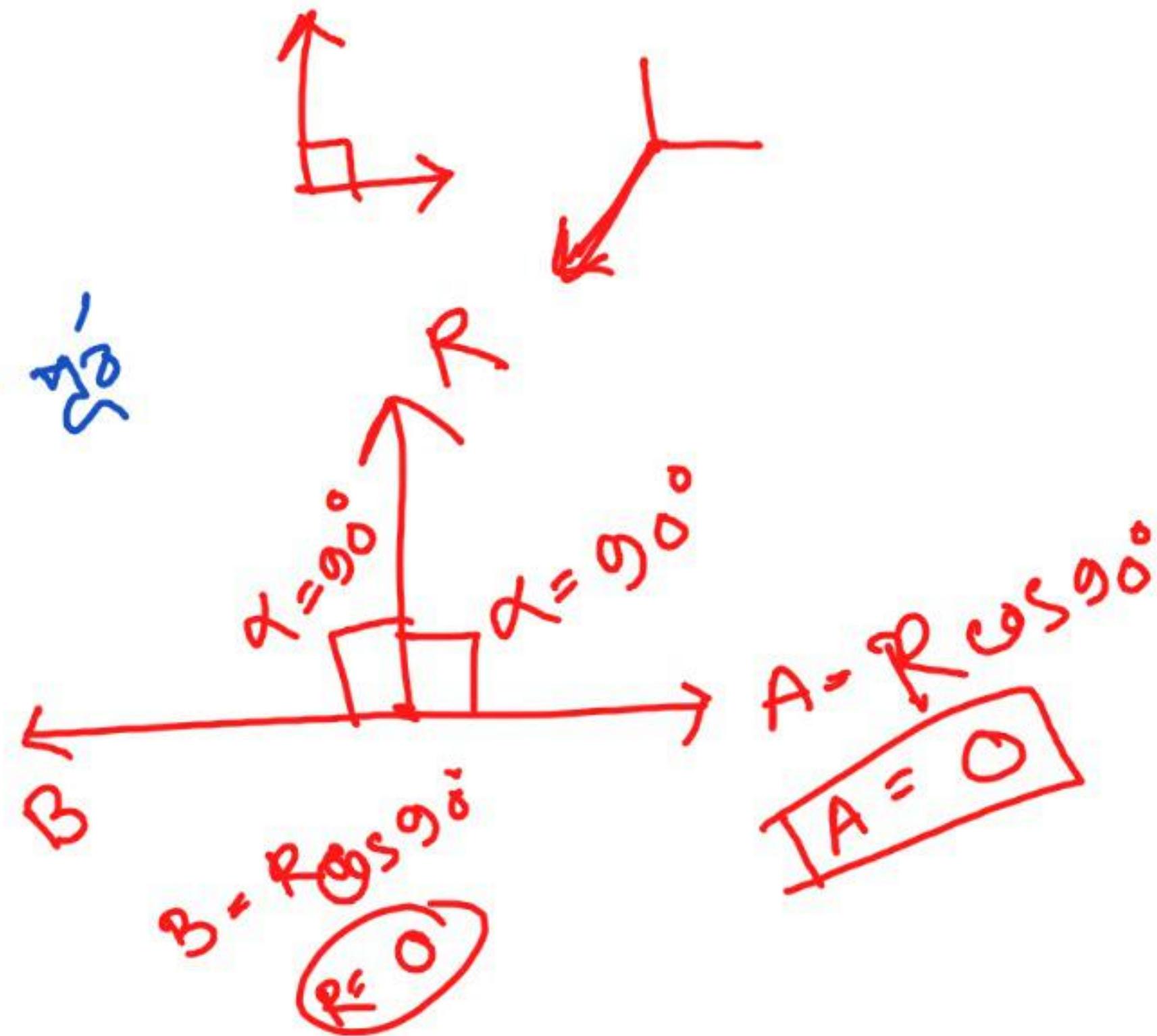
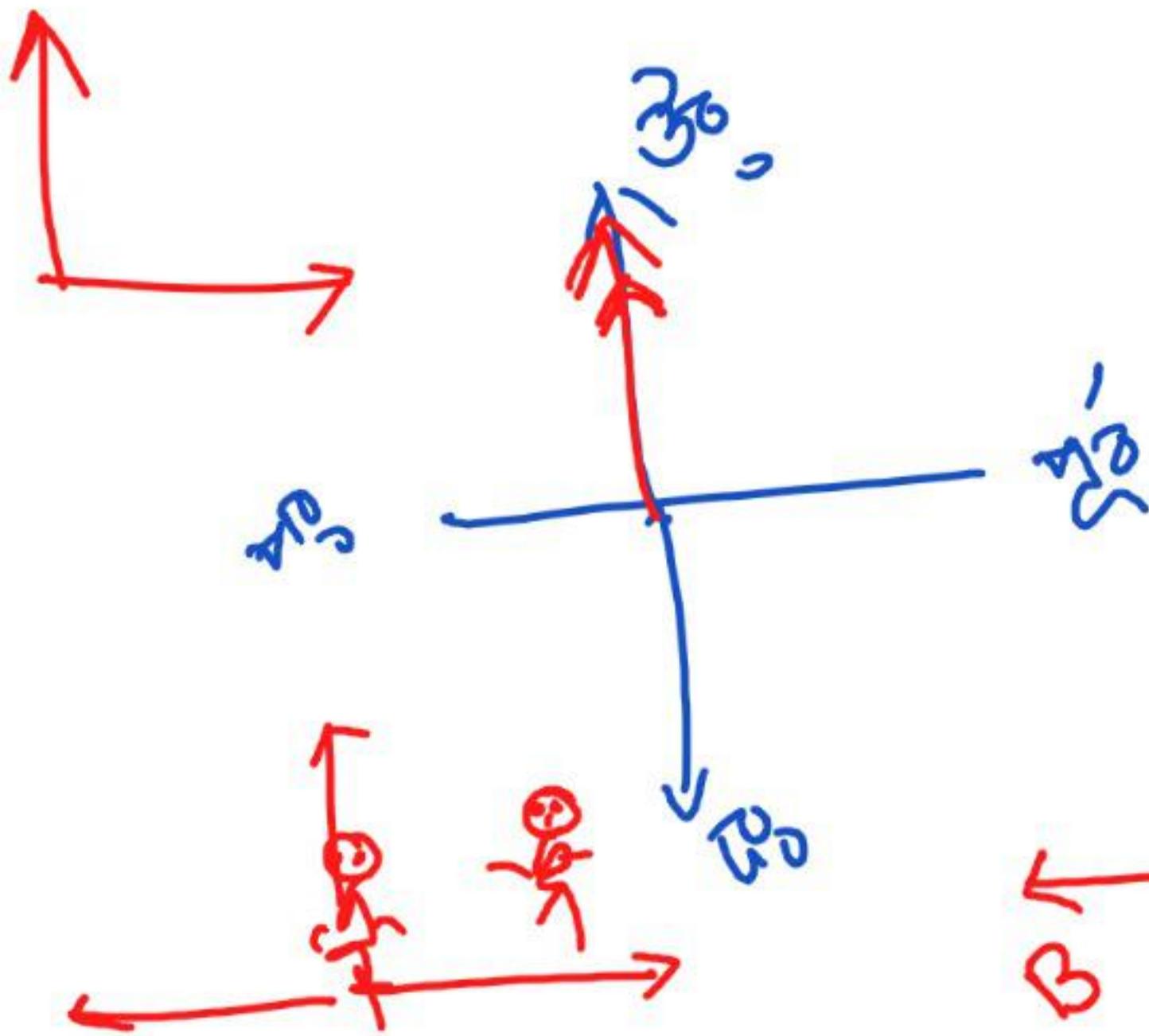
~~$P = \frac{R \sin \beta}{\sin(\alpha + \beta)}$~~

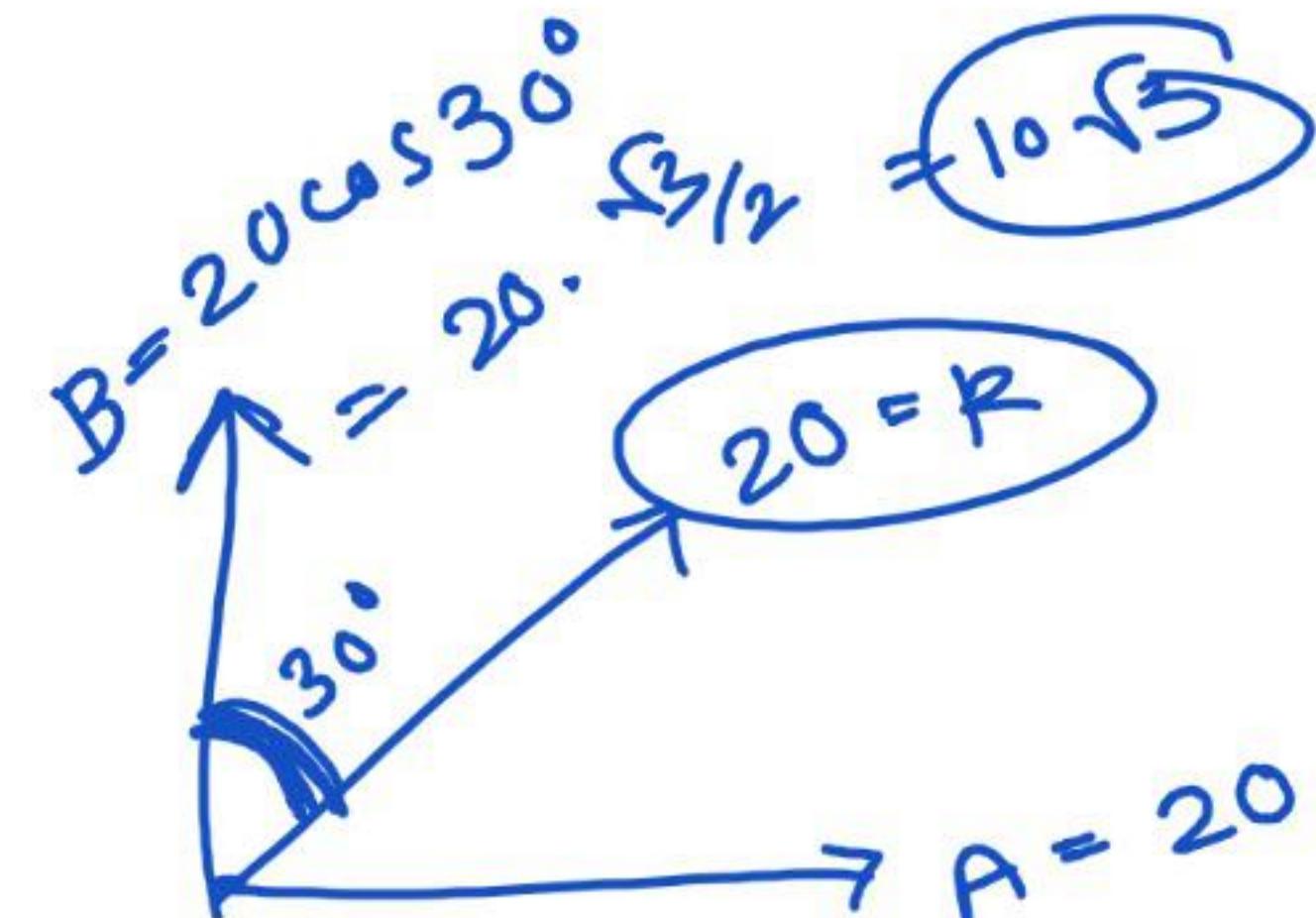
$$\frac{Q}{\sin \alpha} = \frac{R}{\sin(\alpha + \beta)}$$

$$Q = \frac{R \sin \alpha}{\sin(\alpha + \beta)}$$

ADM
W





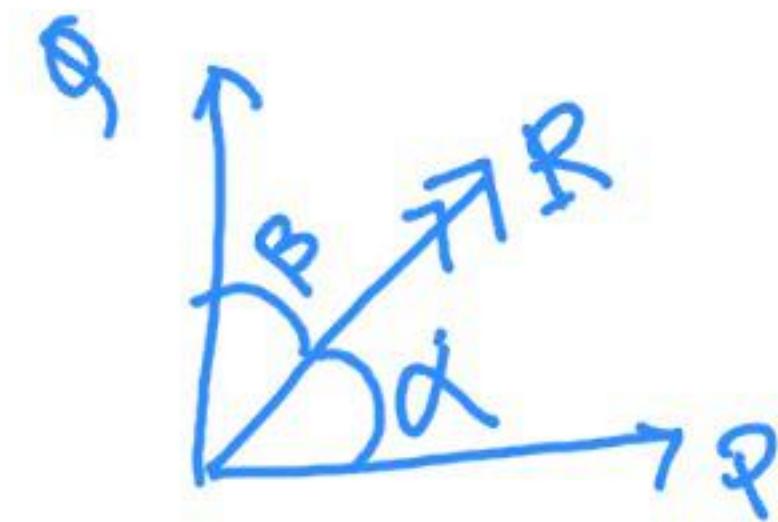


$$A = 10$$
$$B =$$

$$A = 20 \sin 30^\circ$$
$$= 20 \cdot \frac{1}{2}$$
$$A = 10$$

Special Case:

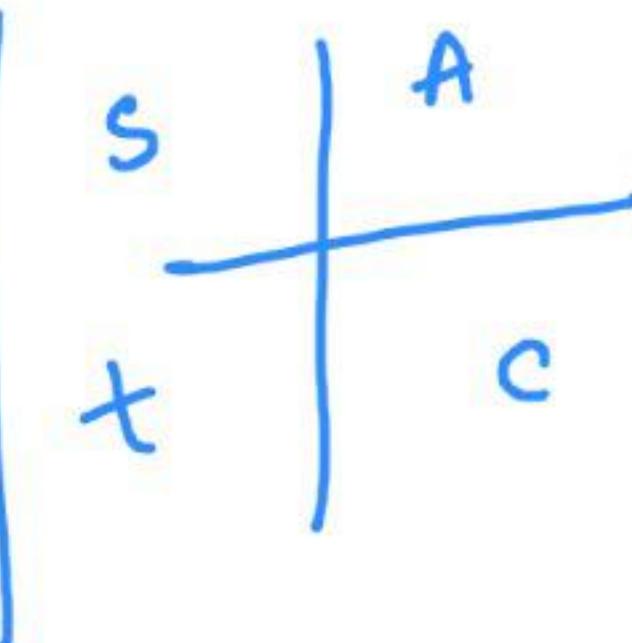
$$\alpha + \beta = 90^\circ$$



$$P = \frac{R \sin \beta}{\sin(\alpha + \beta)}$$

$$\therefore P = \frac{R \sin(90^\circ - \alpha)}{\sin 90^\circ}$$

$$\begin{aligned} \alpha + \beta &= 90^\circ \\ \beta &= (90^\circ - \alpha) \end{aligned}$$

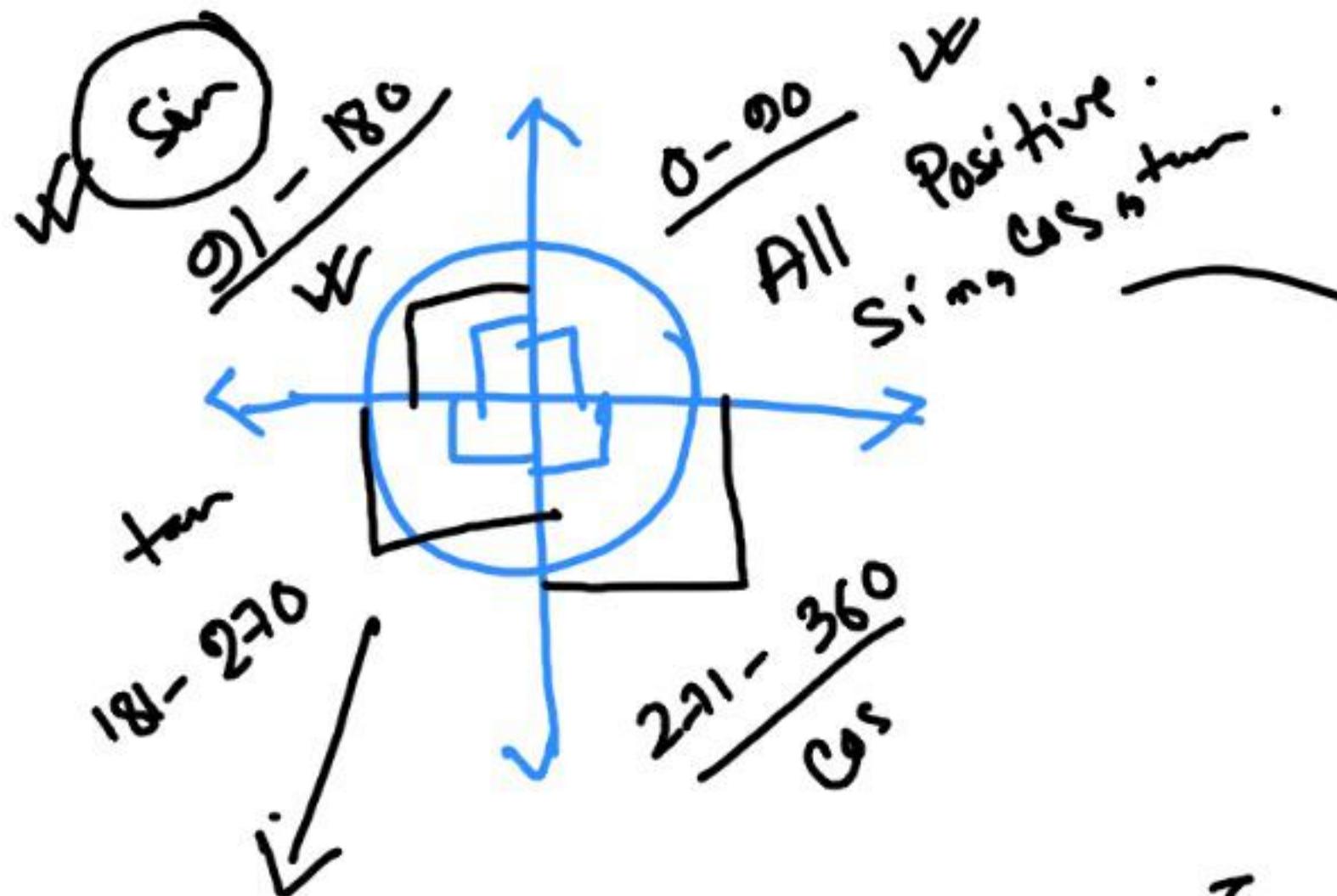


$$P = \frac{R \cos \alpha}{1}$$

$$P = R \cos \alpha$$

$$Q = \frac{R \sin \alpha}{\sin \alpha + \beta}$$

$$Q = R \sin \alpha$$

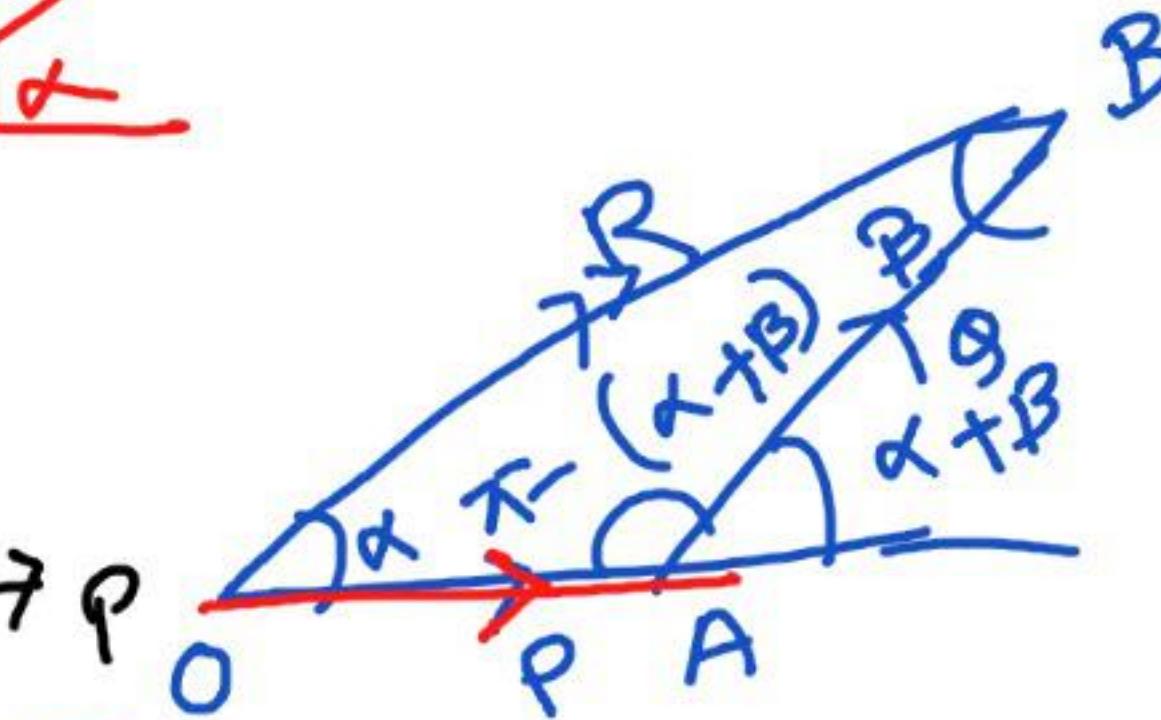
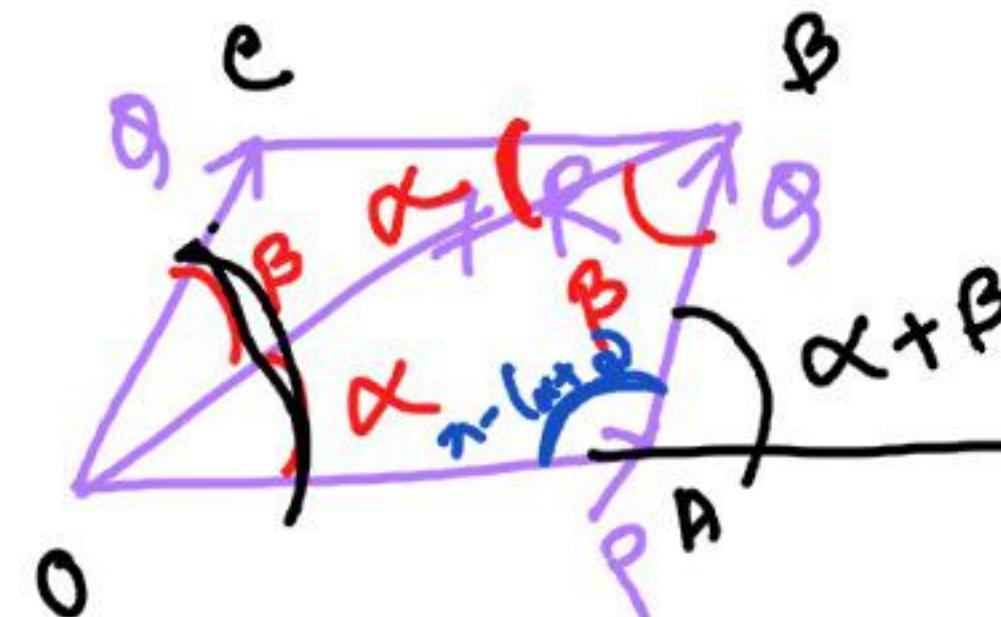


$\sin 150^\circ = \frac{1}{2}$
 $\cos 150^\circ = -\frac{\sqrt{3}}{2}$
 $\tan 150^\circ = -\frac{1}{\sqrt{3}}$

$\sin 30^\circ = +\frac{1}{2}$
 $\cos 30^\circ = +\frac{\sqrt{3}}{2}$
 $\tan 30^\circ = +\frac{1}{\sqrt{3}}$

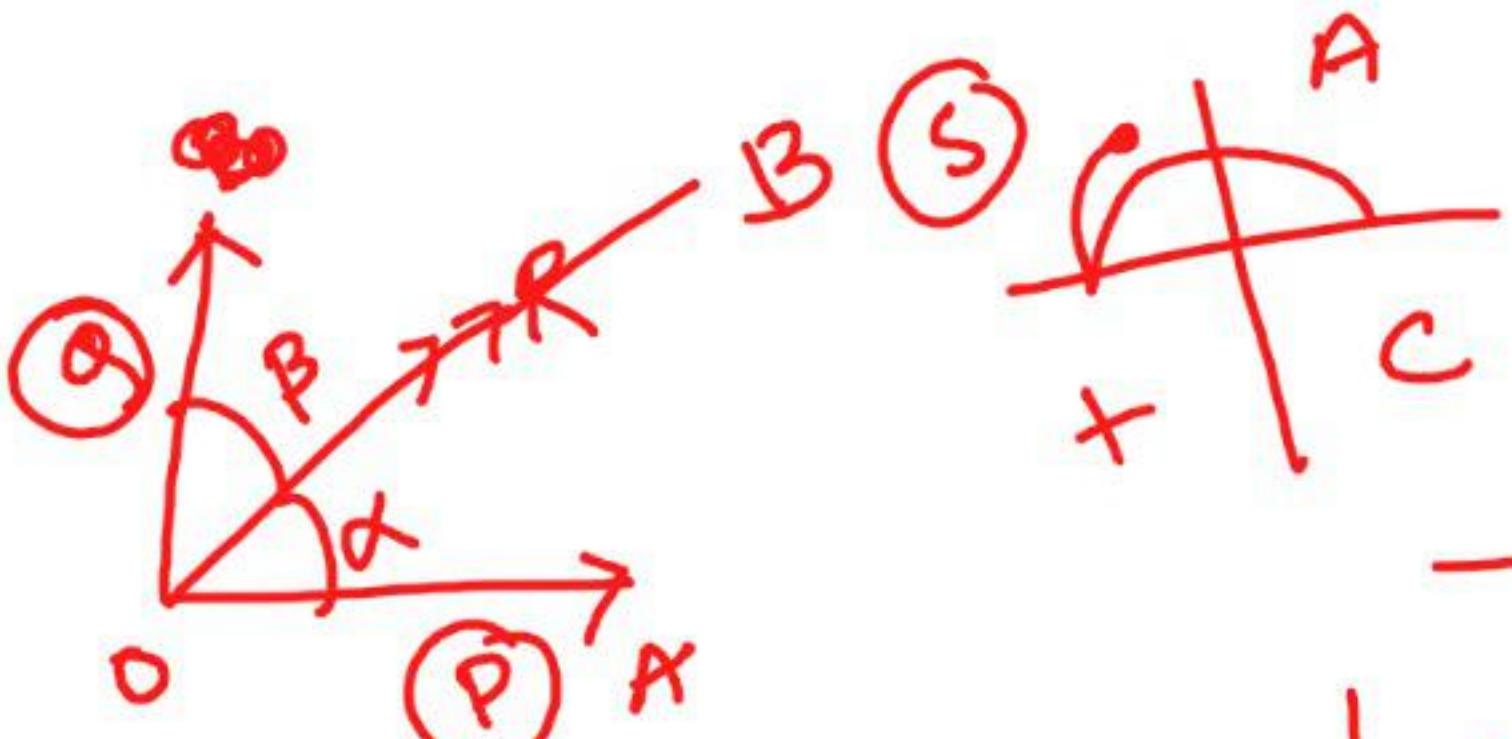
$\sin 120^\circ = \frac{\sqrt{3}}{2}$
 $\cos 120^\circ = -\frac{1}{2}$
 $\tan 120^\circ = -\sqrt{3}$

କ୍ଷେତ୍ର ଉପରେ:



$\triangle OAB \dots$ କିମ୍ବା ଯଥିରୁ କିମ୍ବା ଏହା ଅନ୍ତର୍ଗତ ଦୟା

$$\frac{OA}{\sin \beta} = \frac{AB}{\sin \alpha} = \frac{OB}{\sin (\pi - \alpha - \beta)}$$



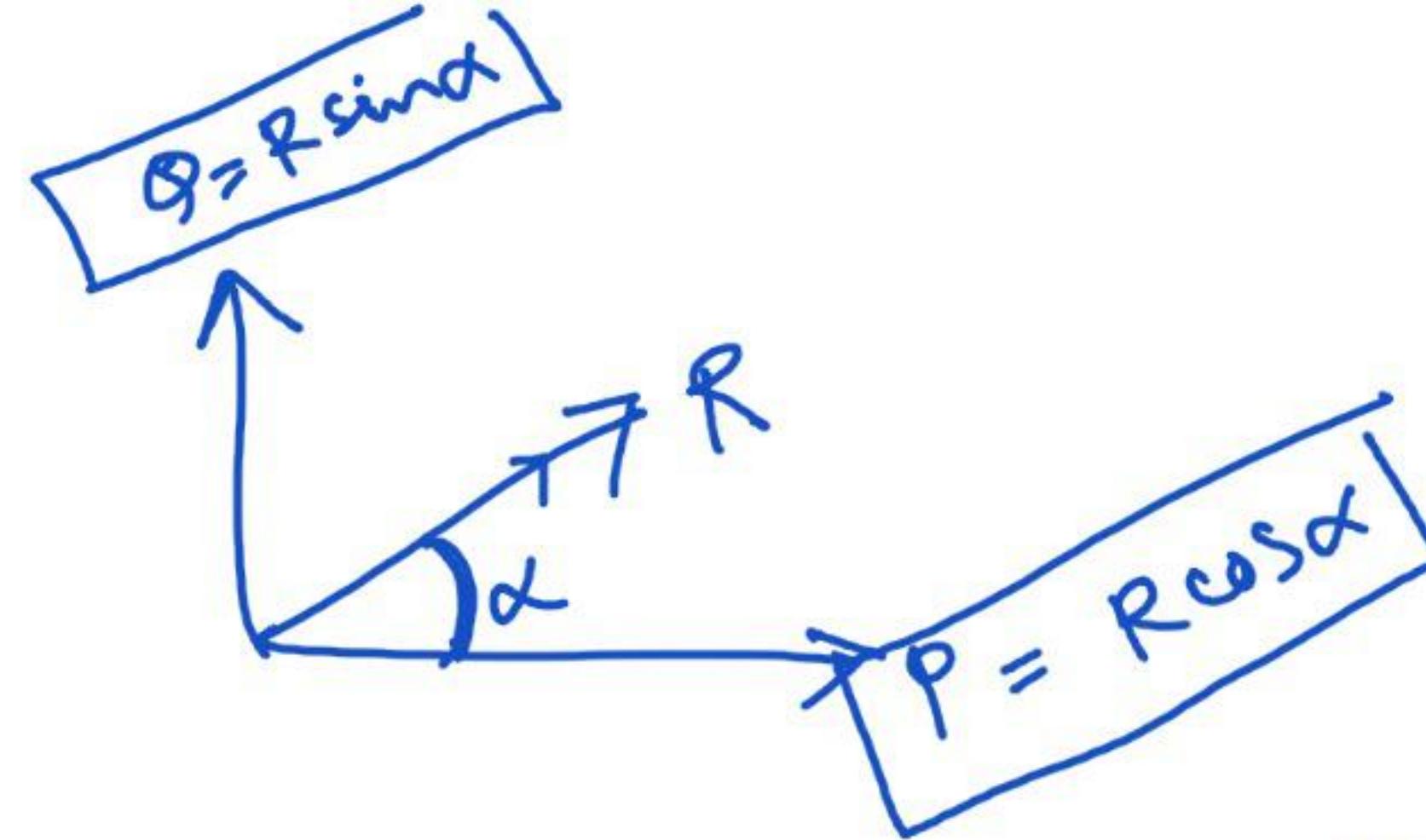
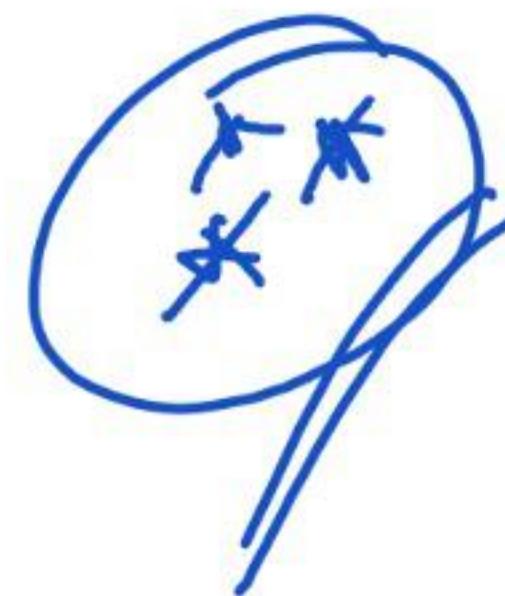
$$Q = \frac{R \sin \alpha}{\sin(\alpha + \beta)}$$

$$\frac{OA}{\sin \beta} = \frac{AB}{\sin \alpha} = \frac{OB}{\sin(\pi - (\alpha + \beta))}$$

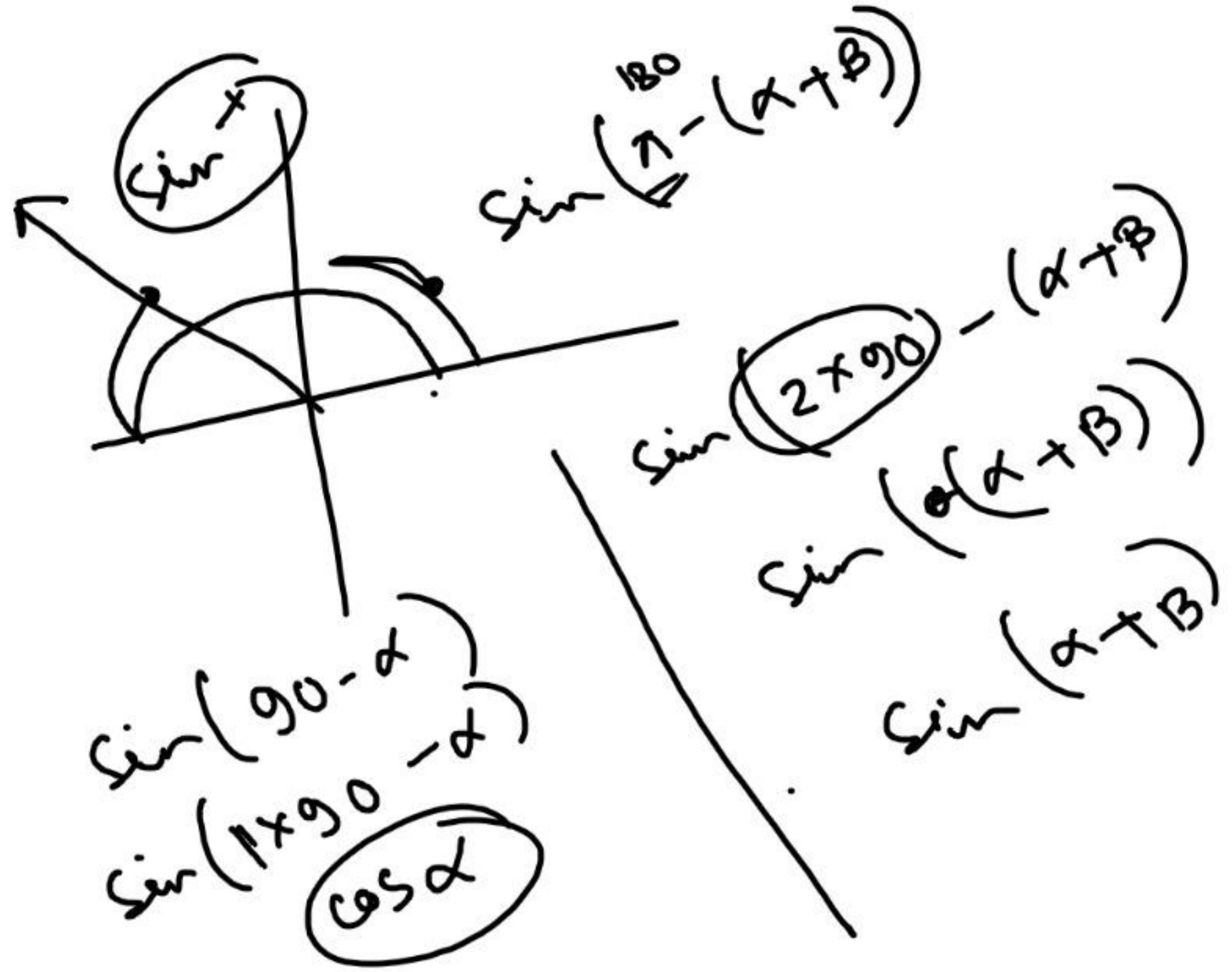
$$\Rightarrow \frac{OA}{\sin \beta} = \frac{OB}{\sin(\alpha + \beta)}$$

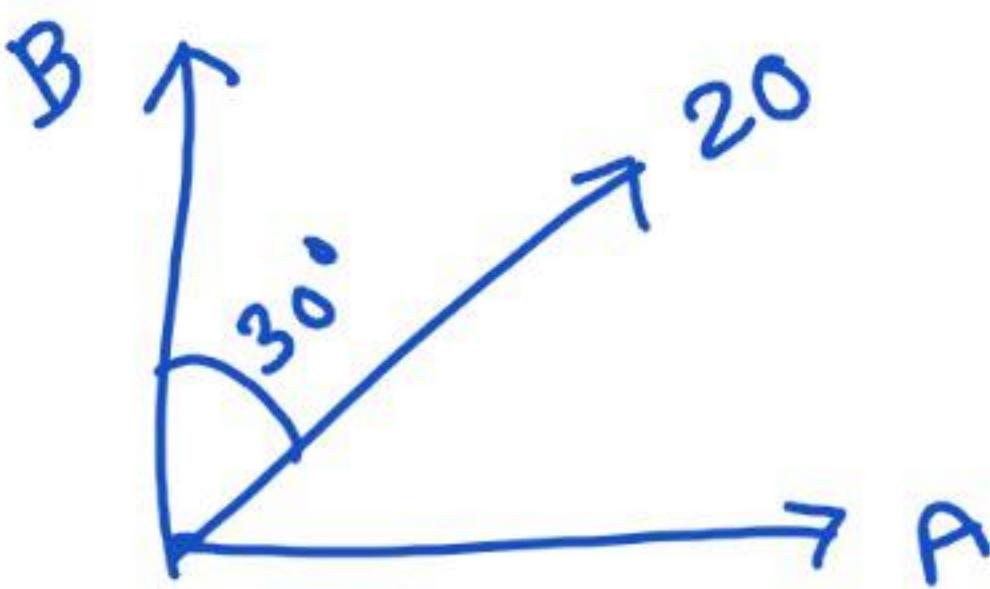
$$\frac{P}{\sin \beta} = \frac{R}{\sin(\alpha + \beta)}$$

$$P = \frac{R \sin \beta}{\sin(\alpha + \beta)}$$



* $\sin \alpha$ $\cos \alpha$ $\tan \alpha$
 $\csc \alpha$ $\sec \alpha$ $\cot \alpha$





A''
 B''

120

Traj. Formula

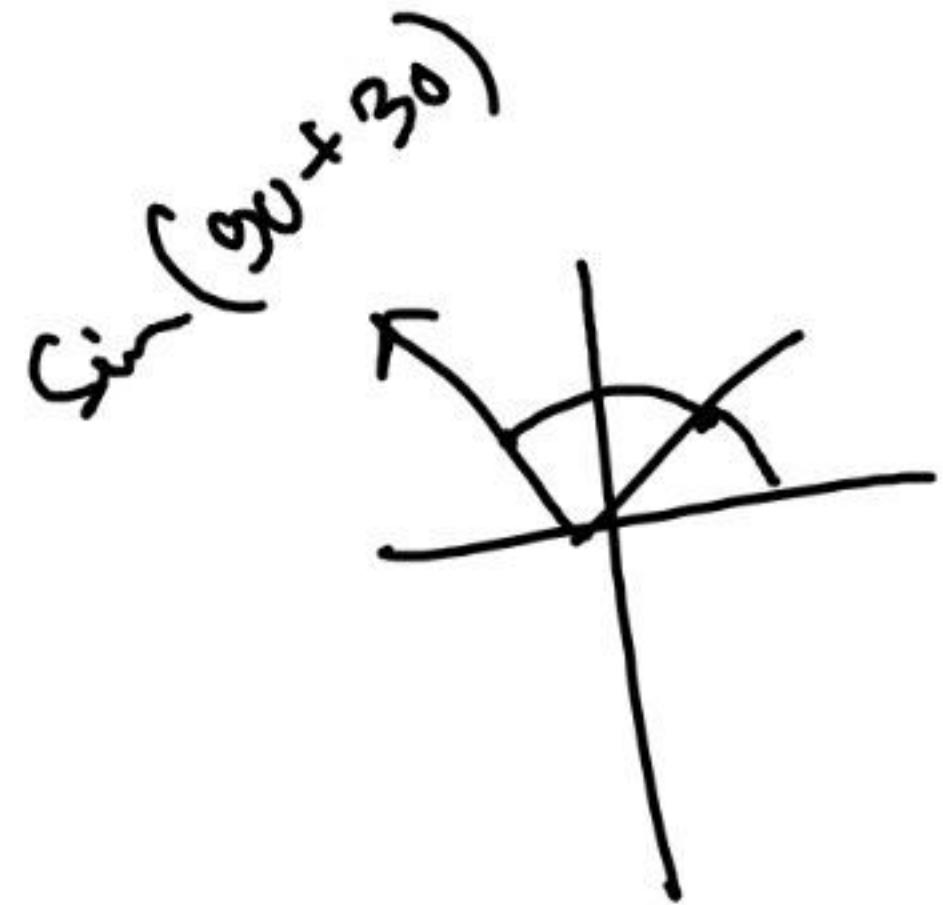
$$\sin(A+B) = \sin A \cos B + \cos A \sin B$$

$$= \sin 80^\circ \cos 60^\circ + \sin 60^\circ \cos 80^\circ$$

$$= \frac{1}{2} \cdot \sqrt{\frac{3}{2}} \frac{1}{2} \quad Y_2 \cdot \frac{\sqrt{3}}{2}$$

=





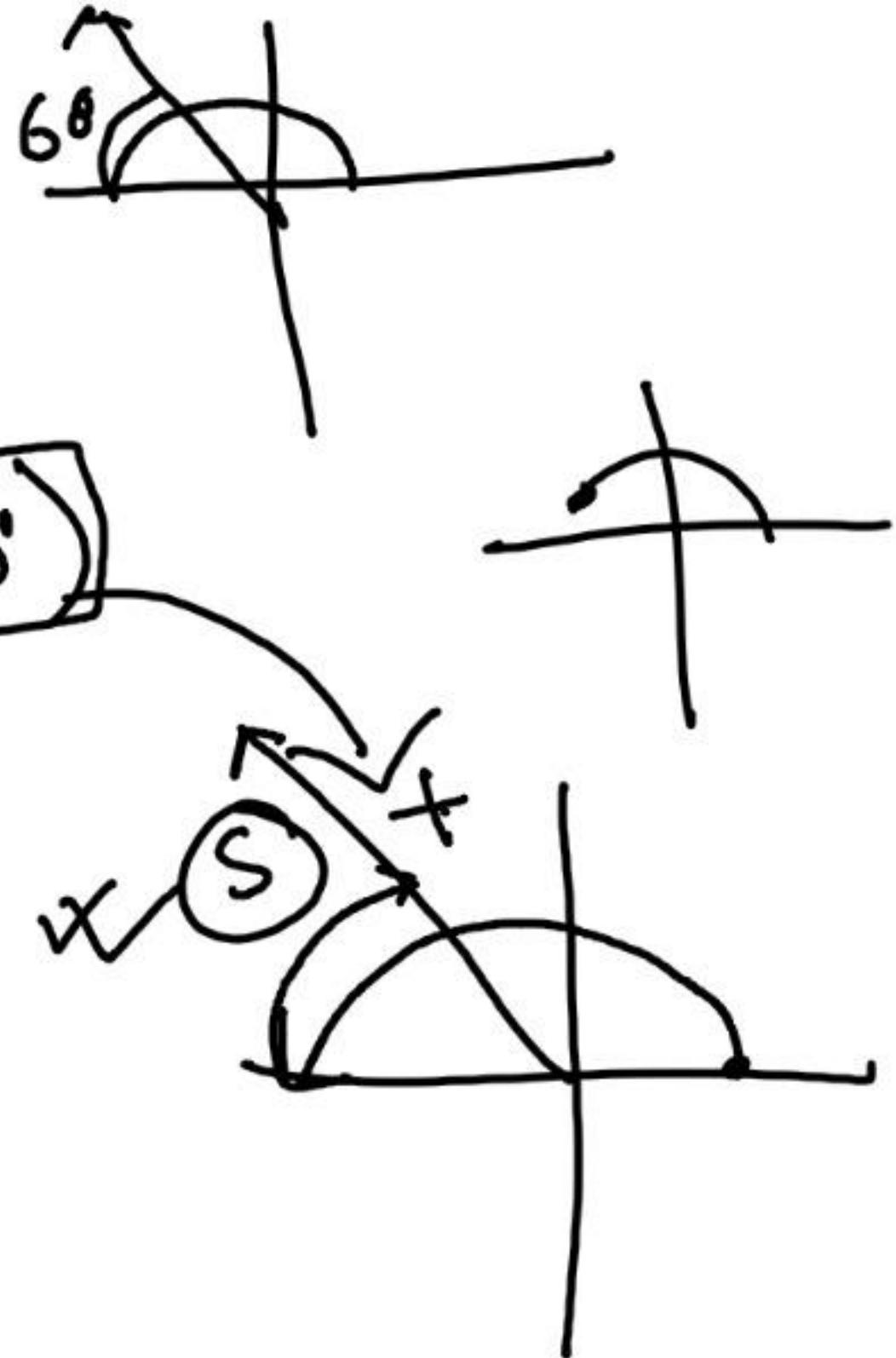
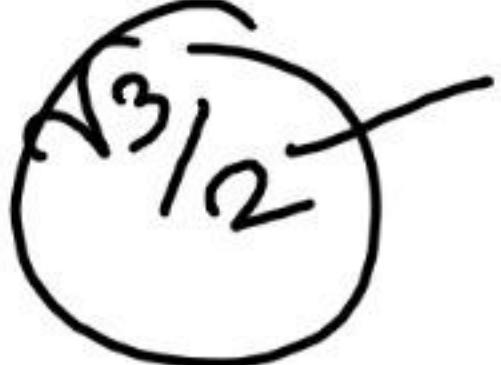
$$\sin(\pi - (4 \times 3))$$

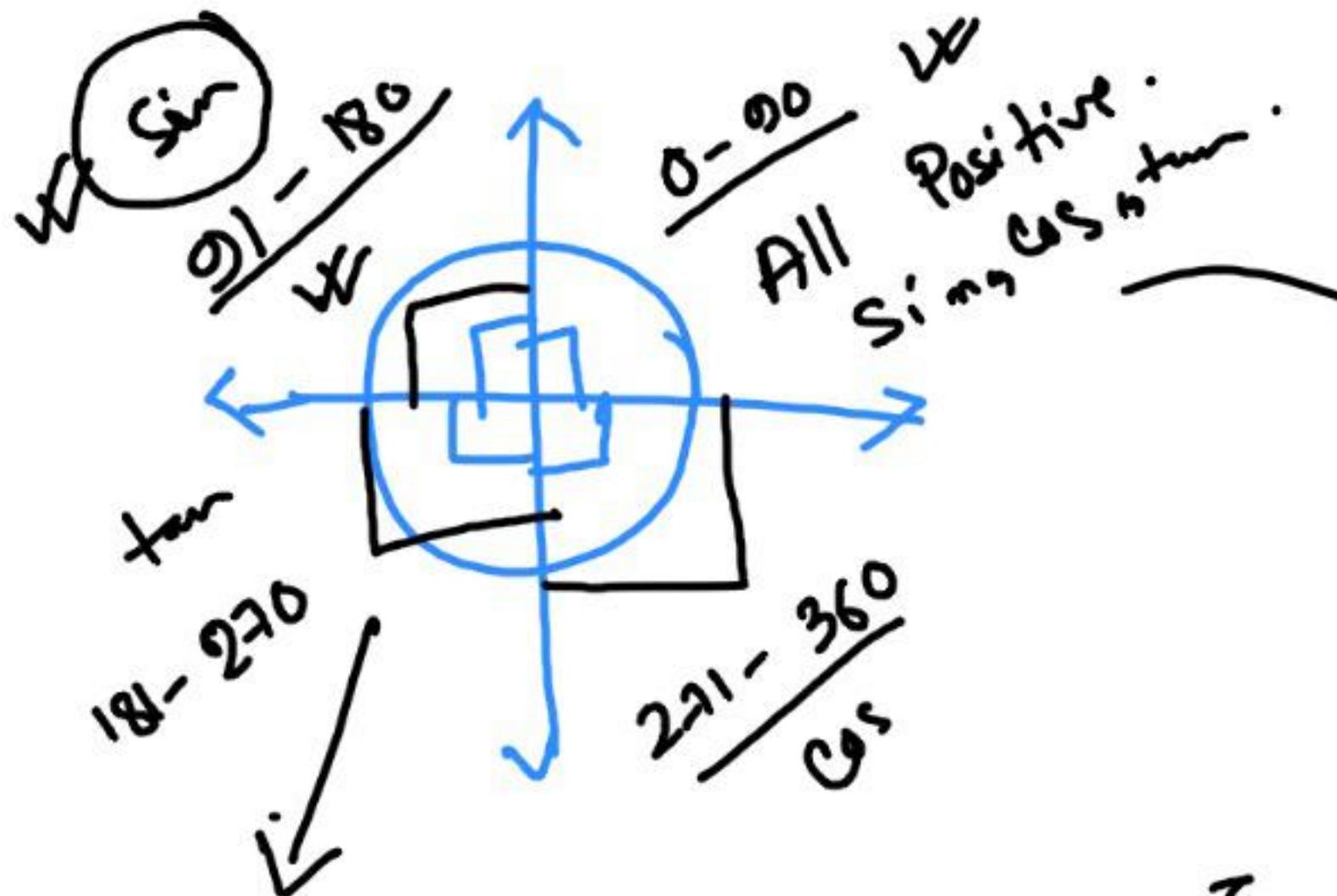
A diagram of a circle with a central angle of $180^\circ - 120^\circ = 60^\circ$. A reference triangle is drawn, with one vertex at the top and two vertices on the circumference. The angle at the top vertex is labeled 60° .

$$\Rightarrow \sin(180 - 60)$$

$$\Rightarrow \boxed{\sin(2 \times 90 - 60)}$$

$$\Rightarrow \sin 60$$





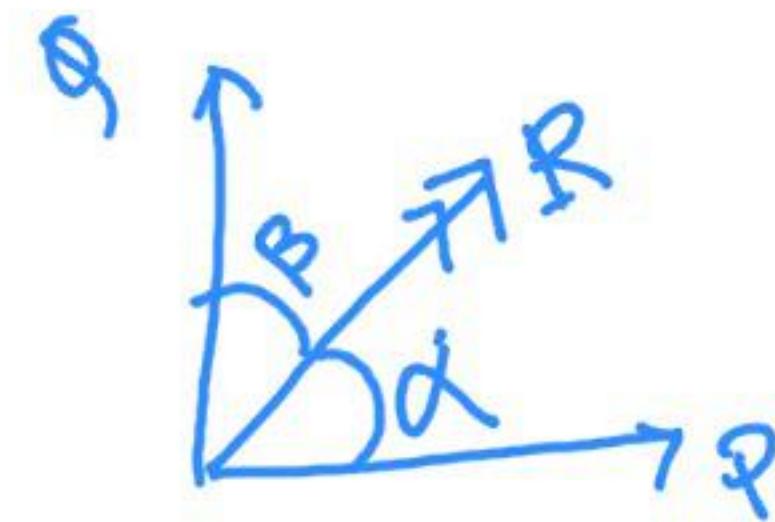
$\sin 15^\circ = \frac{1}{2}$
 $\cos 15^\circ = \frac{\sqrt{3}}{2}$
 $\tan 15^\circ = \frac{1}{\sqrt{3}}$

$\sin 30^\circ = +\frac{1}{2}$
 $\cos 30^\circ = +\frac{\sqrt{3}}{2}$
 $\tan 30^\circ = +\frac{1}{\sqrt{3}}$

$\sin 120^\circ = \frac{\sqrt{3}}{2}$
 $\cos 120^\circ = -\frac{1}{2}$
 $\tan 120^\circ = -\sqrt{3}$

Special Case:

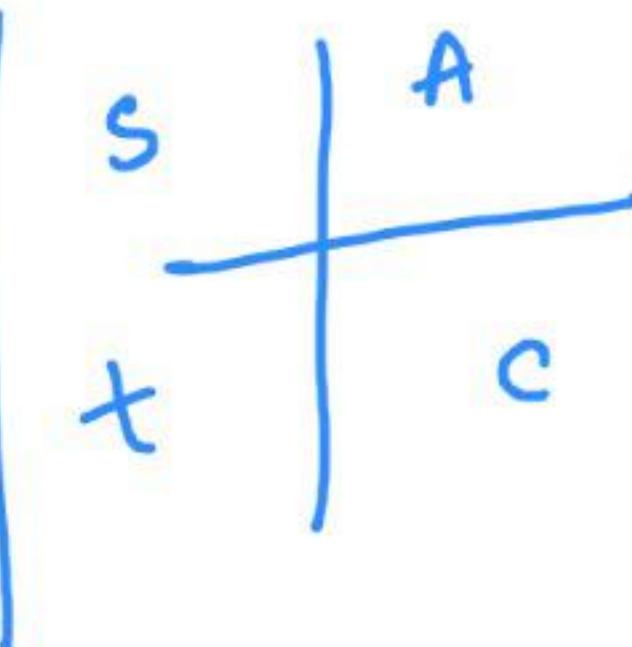
$$\alpha + \beta = 90^\circ$$



$$P = \frac{R \sin \beta}{\sin(\alpha + \beta)}$$

$$\therefore P = \frac{R \sin(90^\circ - \alpha)}{\sin 90^\circ}$$

$$\begin{aligned} \alpha + \beta &= 90^\circ \\ \beta &= (90^\circ - \alpha) \end{aligned}$$



$$P = \frac{R \cos \alpha}{1}$$

$$P = R \cos \alpha$$

$$Q = \frac{R \sin \alpha}{\sin \alpha + \beta}$$

$$Q = R \sin \alpha$$

~~Sine~~ sin

~~AII~~ x

~~Cosec~~ x

One

cos x

~~Sine~~

$\{0^\circ, 30^\circ, 45^\circ, 60^\circ, 90^\circ\}$

$\{0, \frac{1}{2}, \frac{1}{\sqrt{2}}, \frac{\sqrt{3}}{2}, 1\}$

30° 120°

~~Sine~~ 120°

$(90^\circ + 30)$

~~Sine~~ $(1x90) + 30$

$\cos 30^\circ$

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

~~0~~

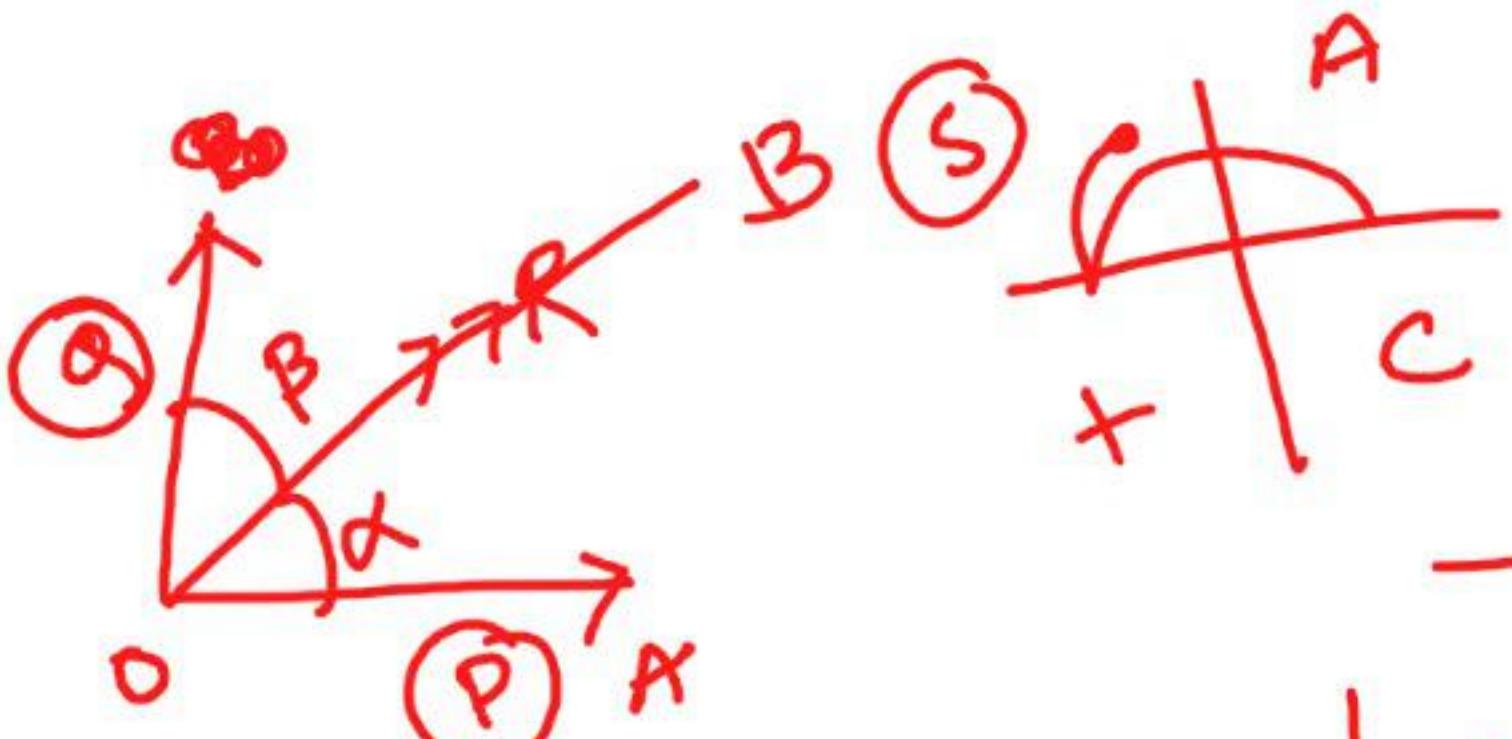
1

0

1×90
 3×90
 7×90

~~sin~~ 90°
 $sin - 0^\circ$
 $cos - sin$

~~tan~~ 120°
 $375^\circ (24)$
 $sin - cos$
 $cos - 050$



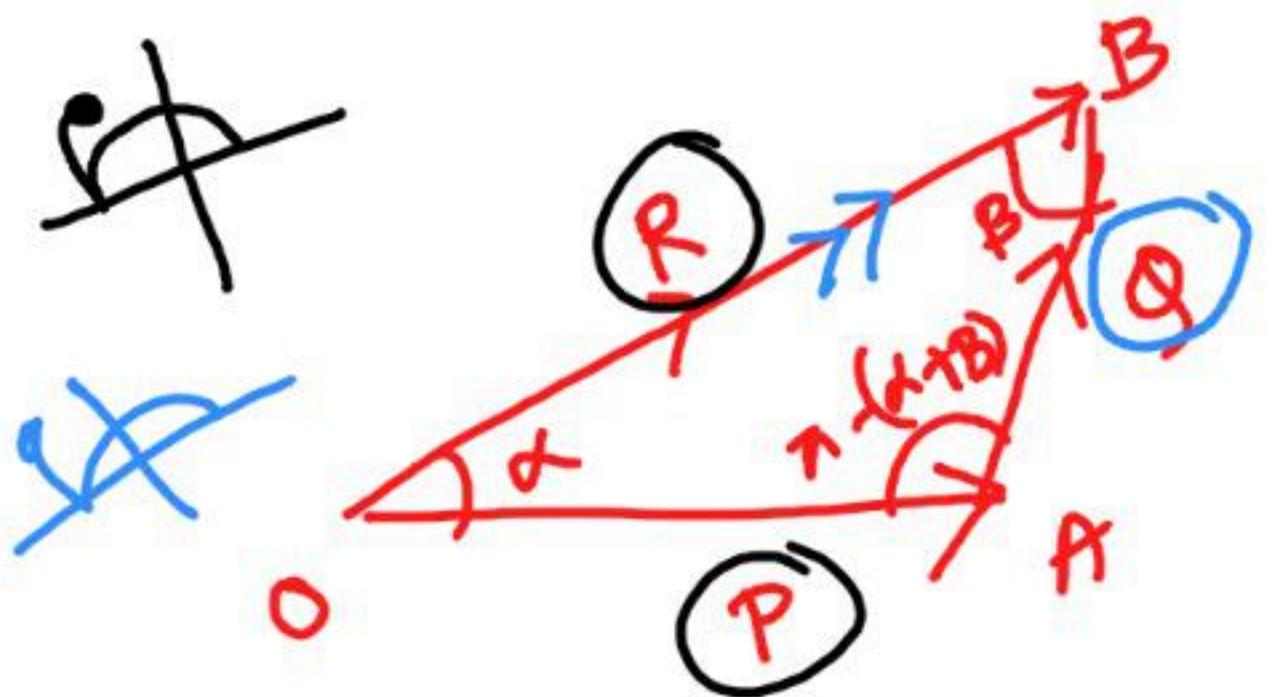
$$Q = \frac{R \sin \alpha}{\sin(\alpha + \beta)}$$

$$\frac{OA}{\sin \beta} = \frac{AB}{\sin \alpha} = \frac{OB}{\sin(\pi - (\alpha + \beta))}$$

$$\Rightarrow \frac{OA}{\sin \beta} = \frac{OB}{\sin(\alpha + \beta)}$$

$$\frac{P}{\sin \beta} = \frac{R}{\sin(\alpha + \beta)}$$

$$P = \frac{R \sin \beta}{\sin(\alpha + \beta)}$$



$$\frac{OA}{\sin \beta} = \frac{OB}{\sin(\pi - (\alpha + \beta))} = \frac{AB}{\sin \alpha}$$

$$\frac{P}{\sin \beta} = \frac{R}{\sin(\alpha + \beta)} = \frac{Q}{\sin \alpha}$$

~~$\frac{P}{\sin \beta} = \frac{R}{\sin(\alpha + \beta)}$~~

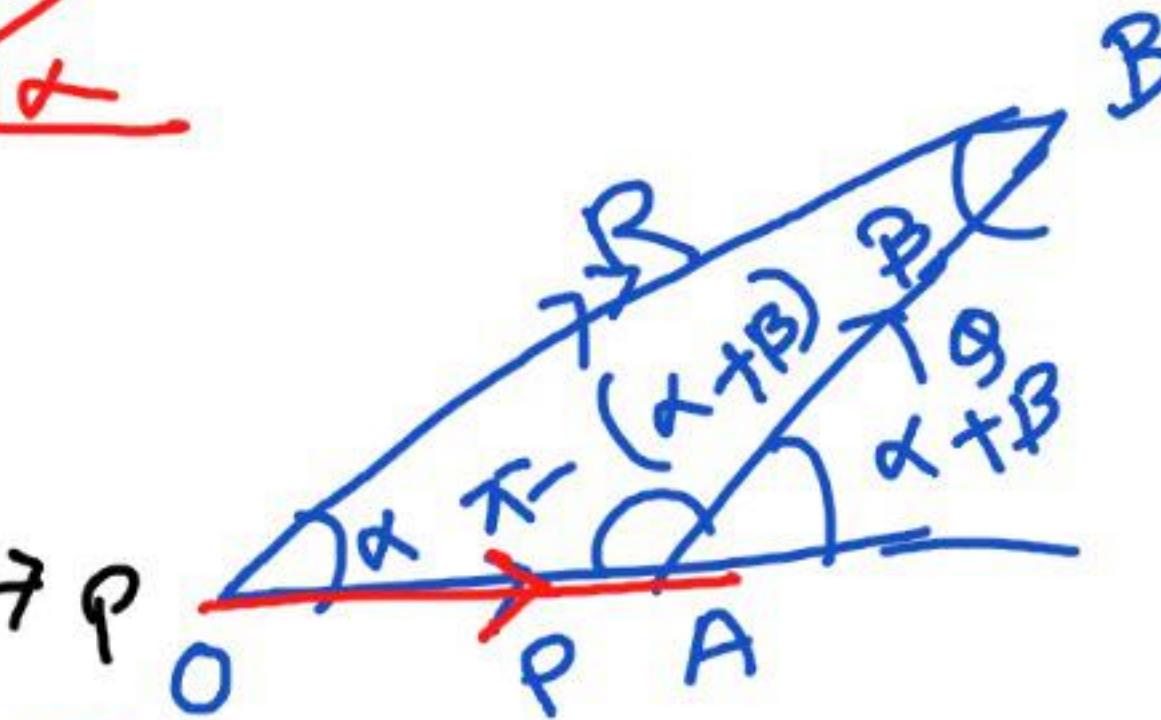
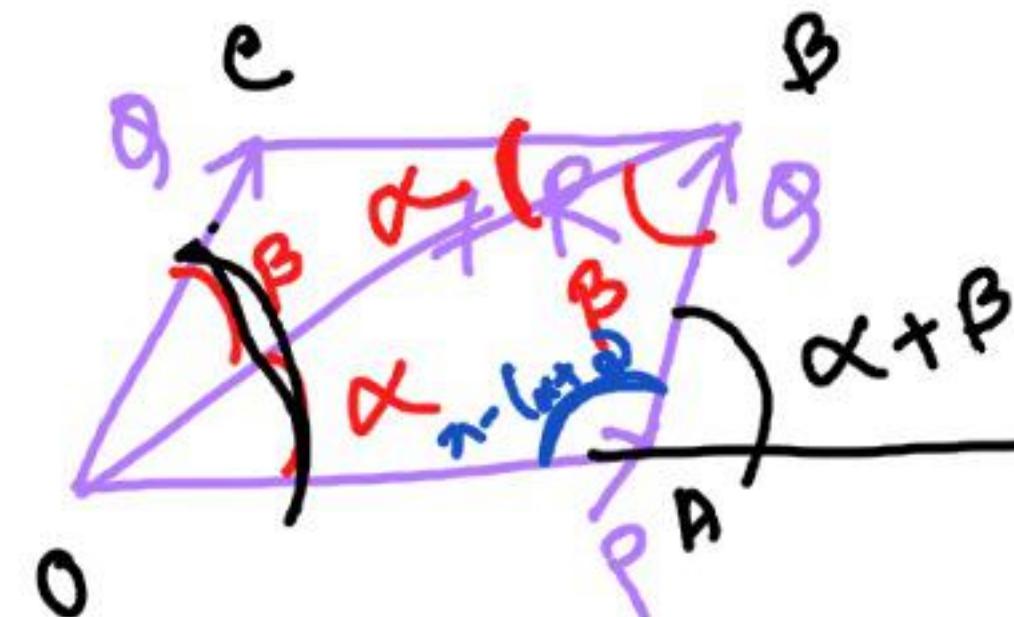
~~$P = \frac{R \sin \beta}{\sin(\alpha + \beta)}$~~

$$\frac{Q}{\sin \alpha} = \frac{R}{\sin(\alpha + \beta)}$$

$$Q = \frac{R \sin \alpha}{\sin(\alpha + \beta)}$$

ADM
W

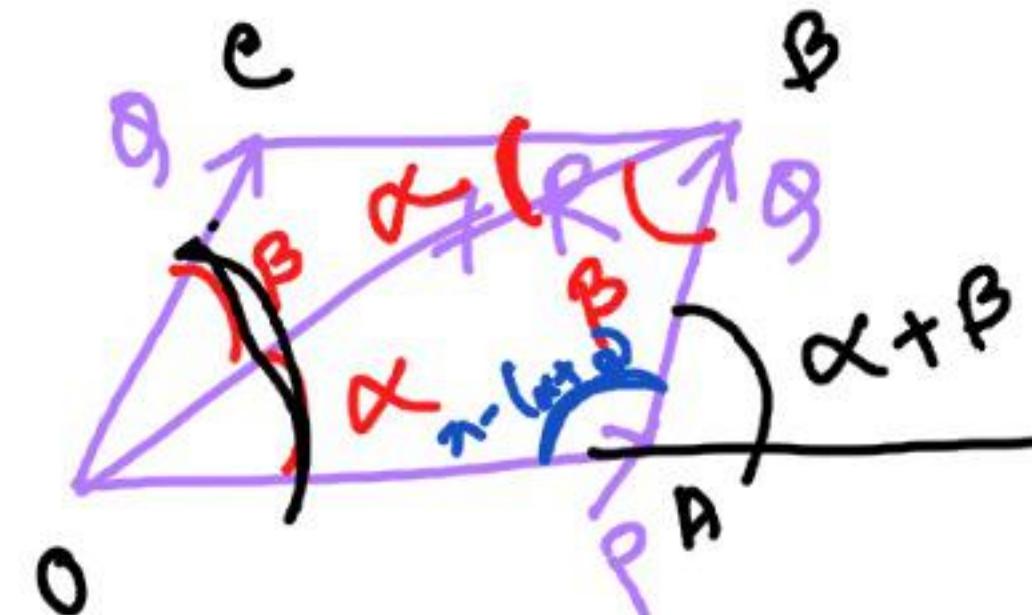
କ୍ଷେତ୍ର ଉପରେଣି:



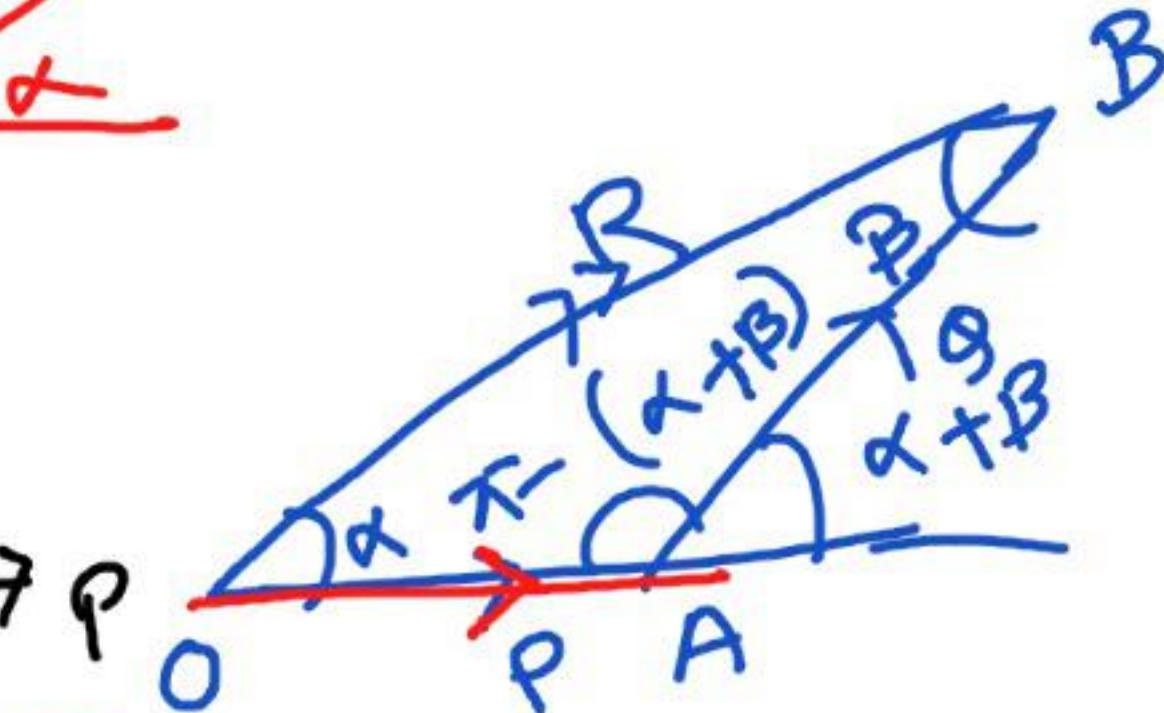
$\triangle OAB \dots$ କିମ୍ବା ଯଥିରୁ କିମ୍ବା ଯଥିରୁ ଅନ୍ତର୍ଗତ ଦୂରତ୍ବ ଏବଂ କୋଣ

$$\frac{OA}{\sin \beta} = \frac{AB}{\sin \alpha} = \frac{OB}{\sin(\pi - \alpha - \beta)}$$

କ୍ଷେତ୍ର ଉପରେ:

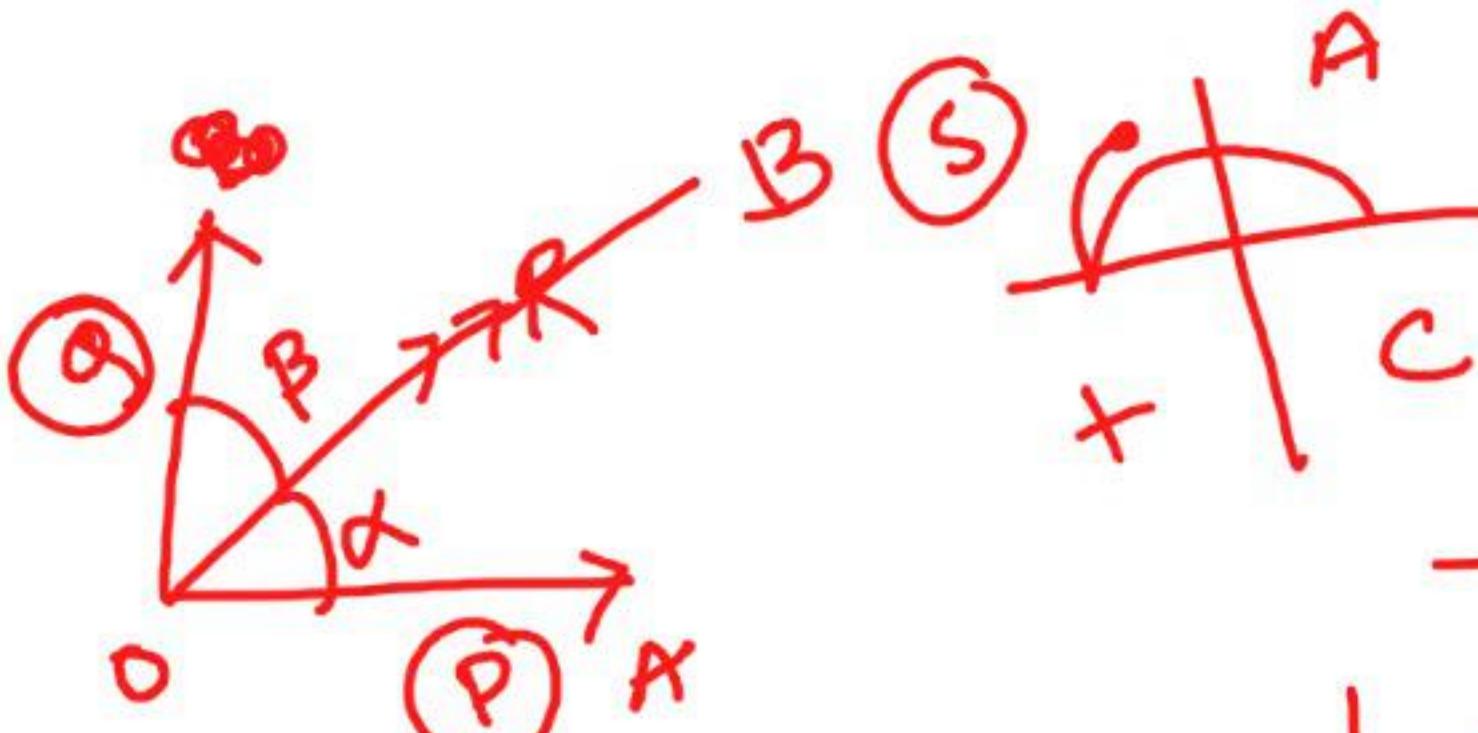


~~କ୍ଷେତ୍ର~~



$\triangle OAB \dots$ କିମ୍ବା ଏକାନ୍ତରେ ଏହା ଏକ ଅନ୍ତର୍ଗତ କିମ୍ବା ଏକ ଅନ୍ତର୍ଗତ କିମ୍ବା

$$\frac{OA}{\sin \beta} = \frac{AB}{\sin \alpha} = \frac{OB}{\sin(\pi - \alpha - \beta)}$$



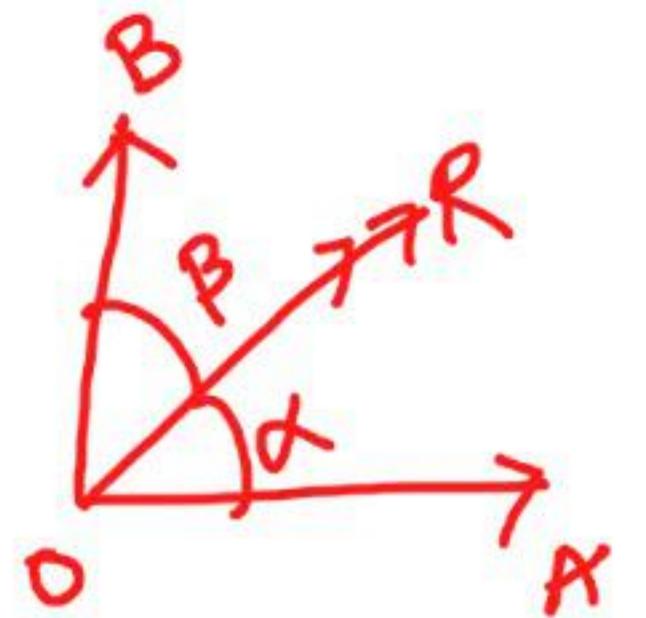
$$Q = \frac{R \sin \alpha}{\sin(\alpha + \beta)}$$

$$\frac{OA}{\sin \beta} = \frac{AB}{\sin \alpha} = \frac{OB}{\sin(\pi - (\alpha + \beta))}$$

$$\Rightarrow \frac{OA}{\sin \beta} = \frac{OB}{\sin(\alpha + \beta)}$$

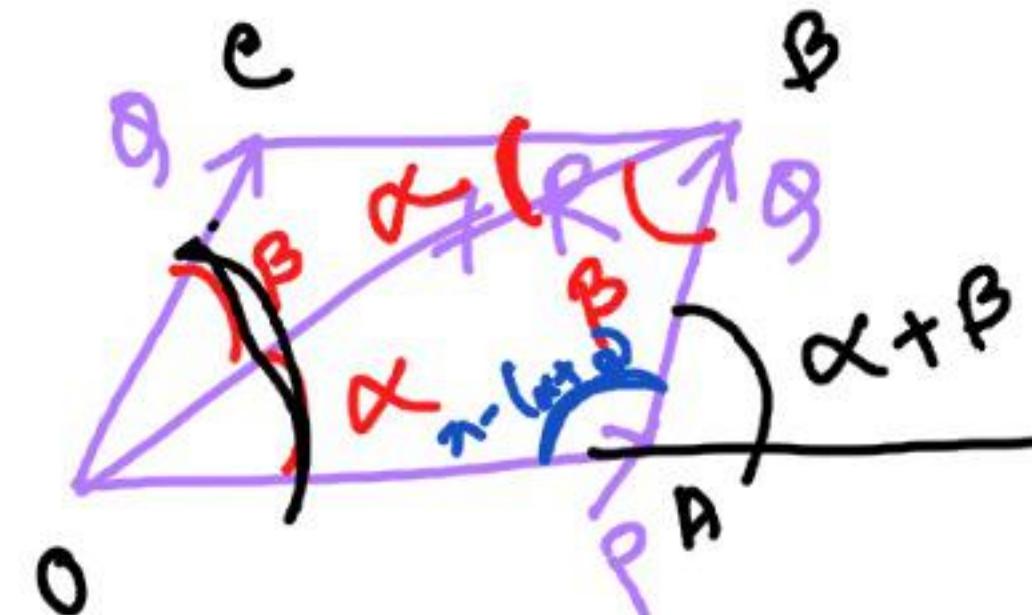
$$\frac{P}{\sin \beta} = \frac{R}{\sin(\alpha + \beta)}$$

$$P = \frac{R \sin \beta}{\sin(\alpha + \beta)}$$

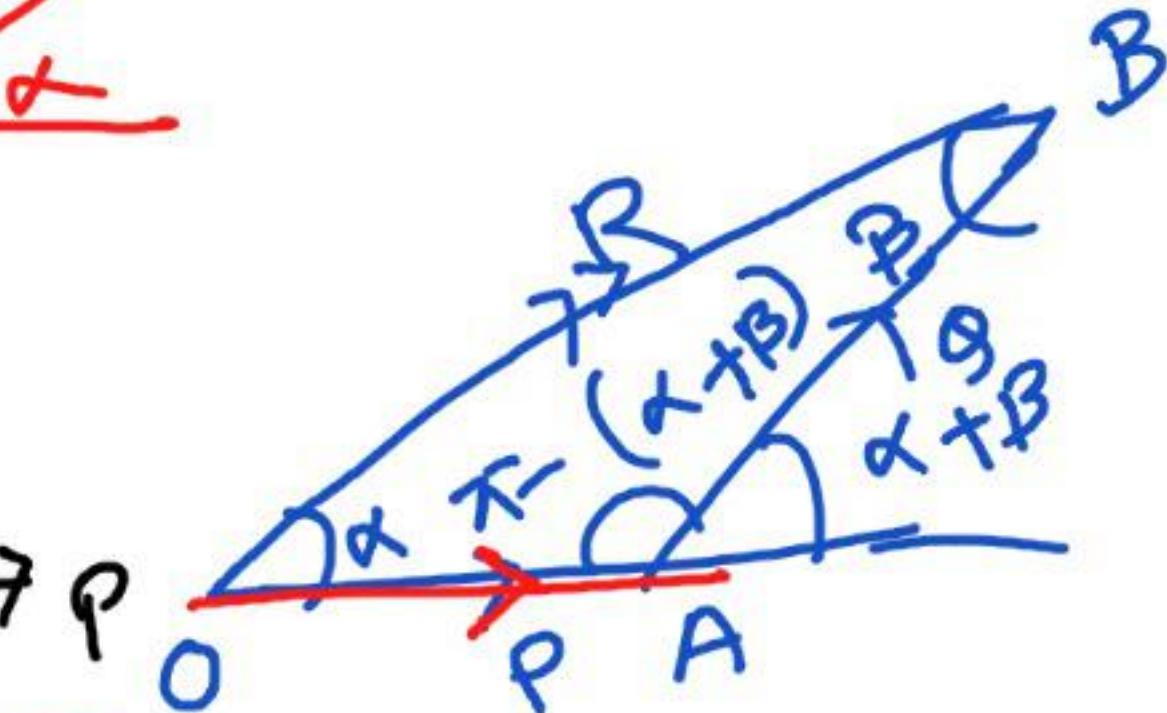


$$\frac{OA}{\sin \beta} = \frac{AB}{\sin \alpha} = \frac{OB}{\sin(\pi - (\alpha + \beta))}$$

କ୍ଷେତ୍ର ଉପରେ:

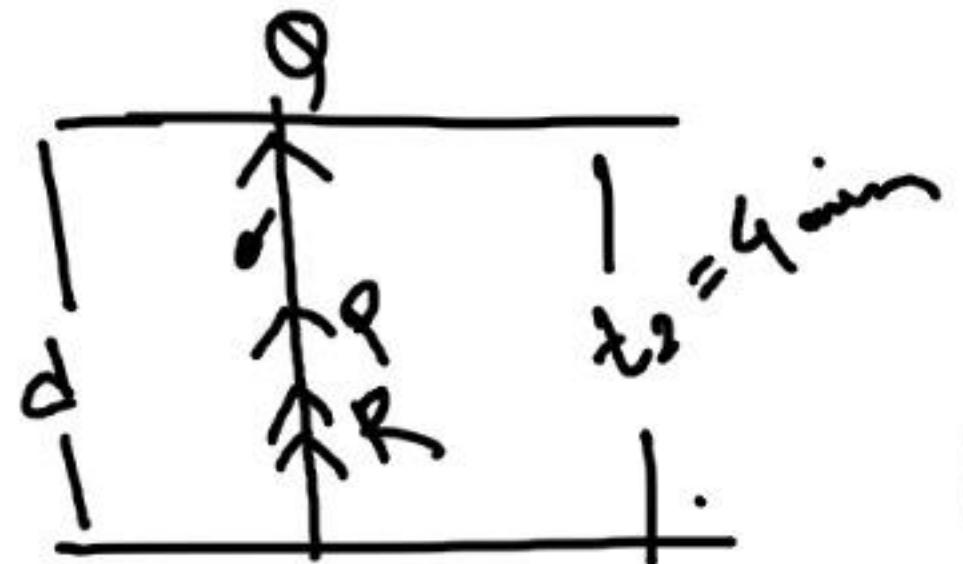


~~କ୍ଷେତ୍ର~~
~~ଜୀବ~~



$\triangle OAB \dots$ କିମ୍ବା ଯଥିରୁ କିମ୍ବା ଏହା ଅନ୍ତର୍ଗତ ଦୟା

$$\frac{OA}{\sin \beta} = \frac{AB}{\sin \alpha} = \frac{OB}{\sin (\pi - \alpha - \beta)}$$



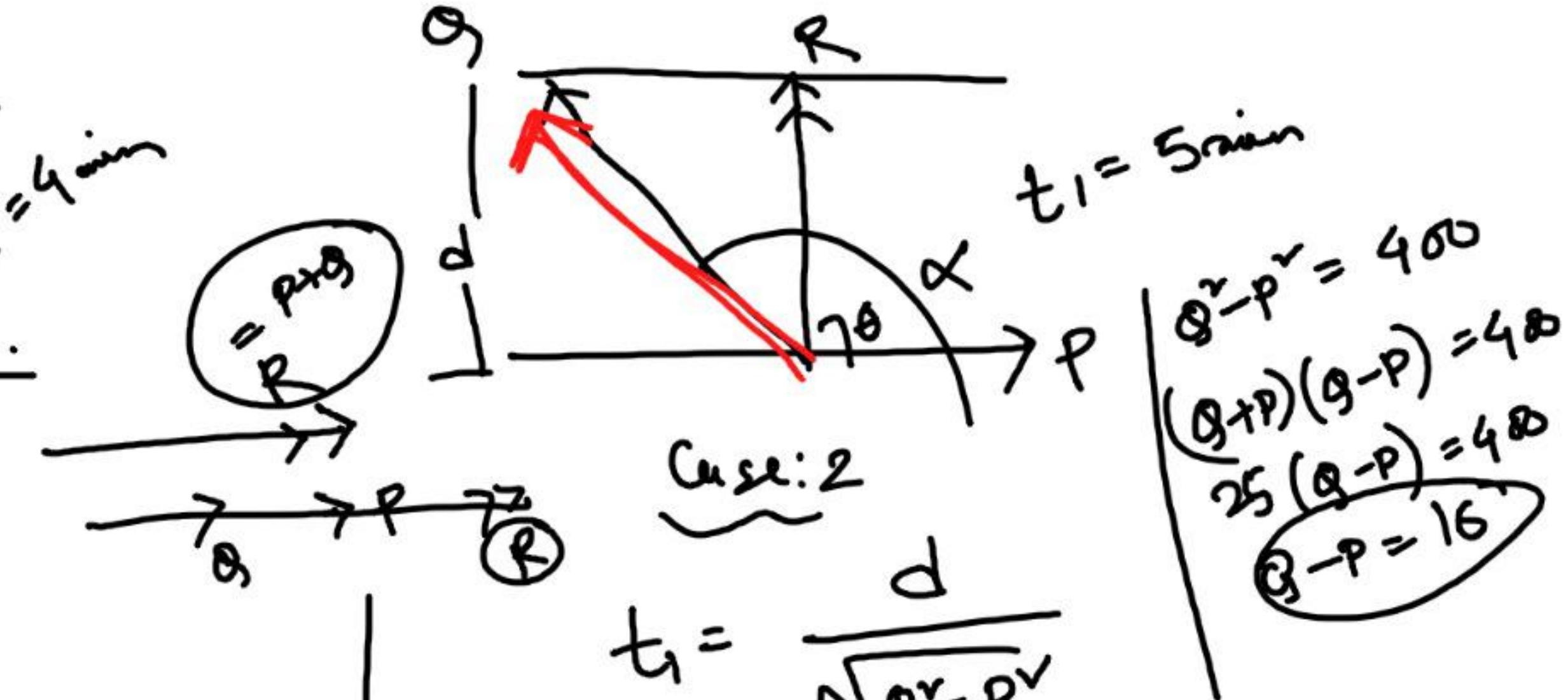
Case: 1

$$d = R \cdot t$$

$$\Rightarrow d = (Q + P) t_2 \quad 25$$

$$\Rightarrow Q + P = \frac{d}{t_2} = \frac{100}{A}$$

$$\Rightarrow \boxed{Q + P = 25}$$



$$t_1 = \frac{d}{\sqrt{Q^v - P^v}}$$

$$\therefore \sqrt{Q^v - P^v} = \frac{d}{t_1} = \frac{100}{5} = 20$$

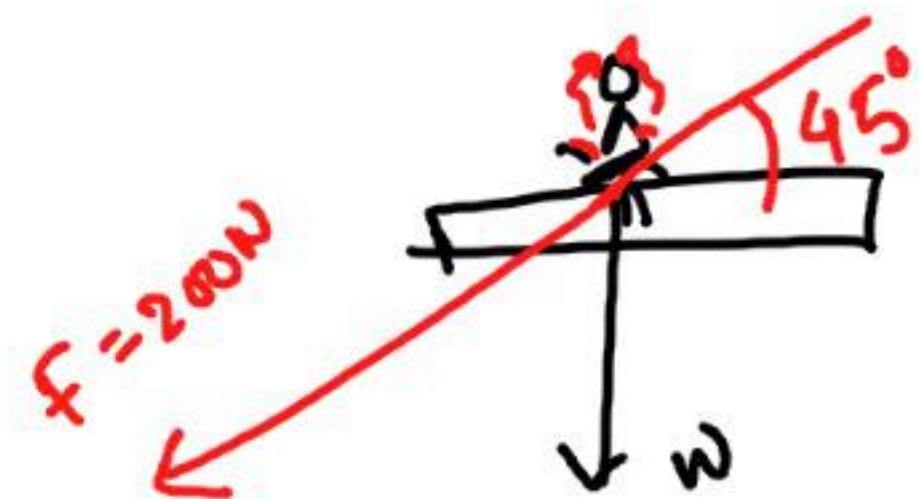
$$\therefore \sqrt{Q^v - P^v} = 20$$

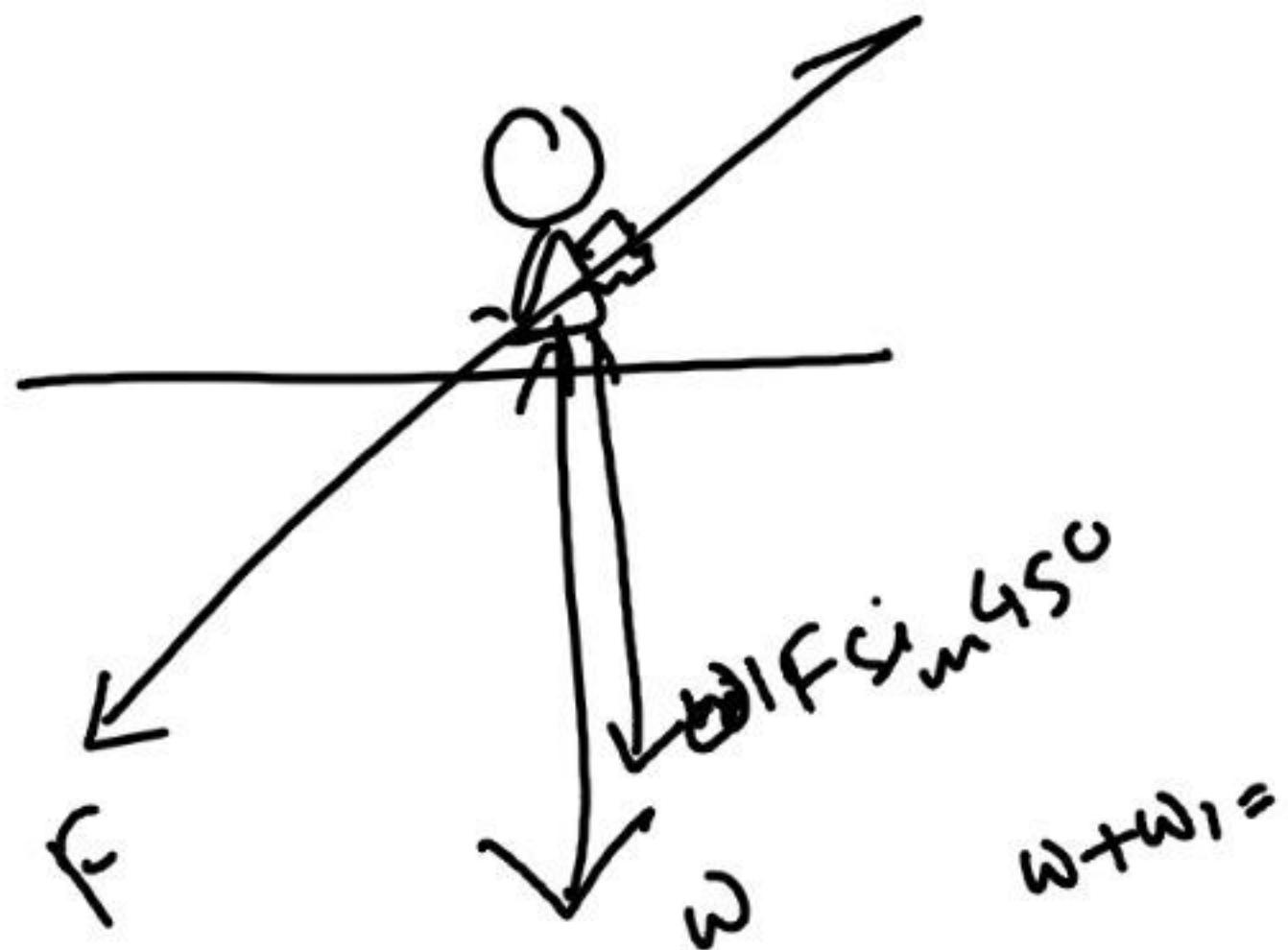
$$Q^v - P^v = 400$$

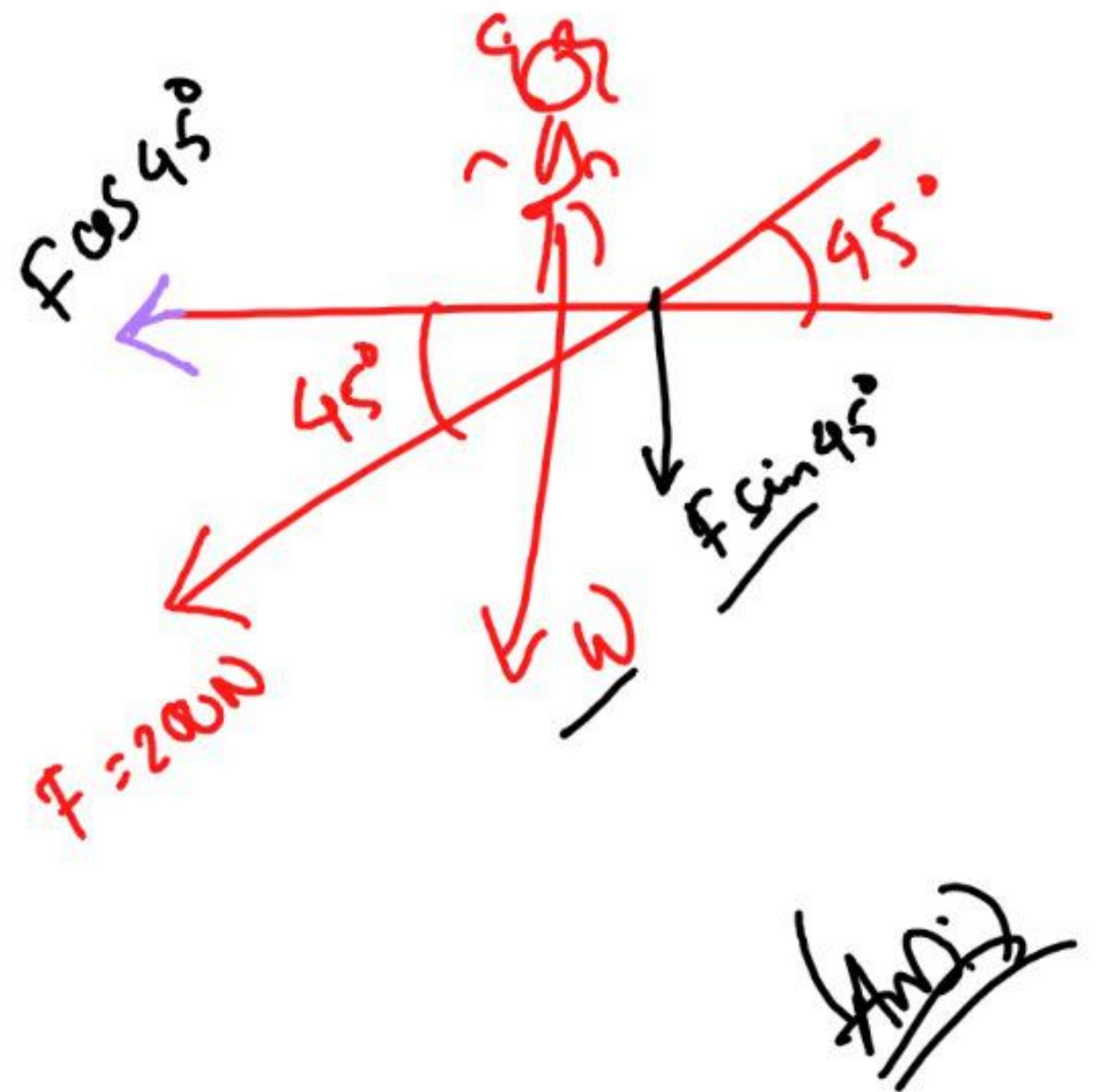
$$\begin{aligned} Q + P &= 25 \\ Q \cdot P &= 16 \\ P, Q &= \end{aligned}$$

* ପ୍ରକାଶ କଷେତ୍ର ପାଇଁ ପାଞ୍ଚ ମାଟ୍ରାମ୍ ଲେଖିଲା ଦାଖିଲେ
 ପ୍ରତ୍ୟେକ ମାଟ୍ରାମ୍ ହାତ୍, ଅନ୍ଧିକାରୀ ଉଚ୍ଚିତ୍ତ ହାତ୍ 45°
 ଦେଖାଯାଇଛି 200N ଠଳ ଏଥାଜି କବି ଏତ କିମ୍ବା କିମ୍ବା
 କିମ୍ବା $700N$ ଏଥାଜି କିମ୍ବା କିମ୍ବା କିମ୍ବା କିମ୍ବା କିମ୍ବା କିମ୍ବା

କୁଳାବାହୀ ଅନୁତ୍ତ ପାଞ୍ଚ ମାଟ୍ରାମ୍ ?





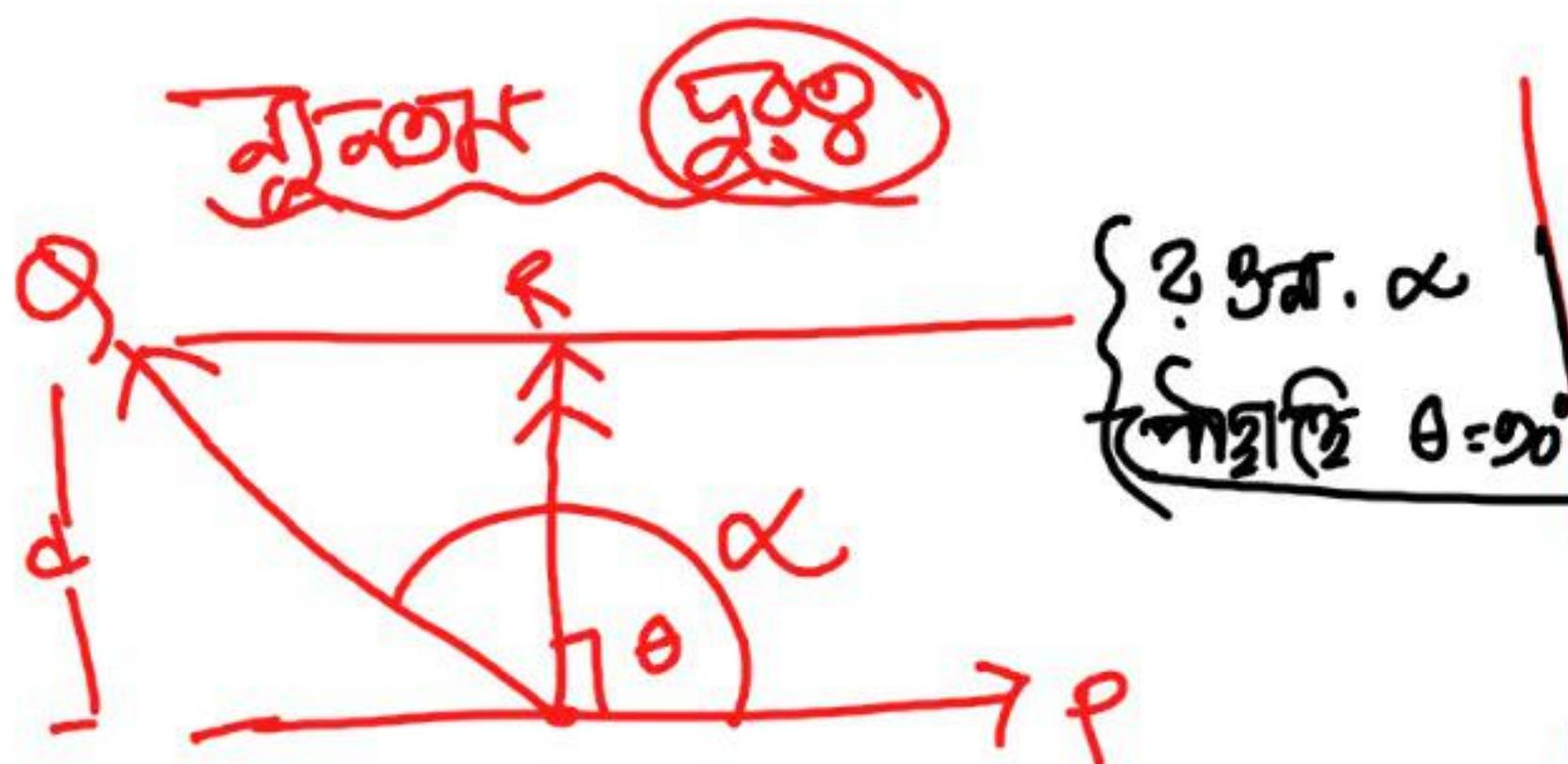


$$W + F \sin 45^\circ = 700$$

$$W = 700 - 200 \sin 45^\circ$$

$$W = 700 - 200 \cdot \frac{1}{\sqrt{2}}$$

$$W = 558.6 \text{ N}$$

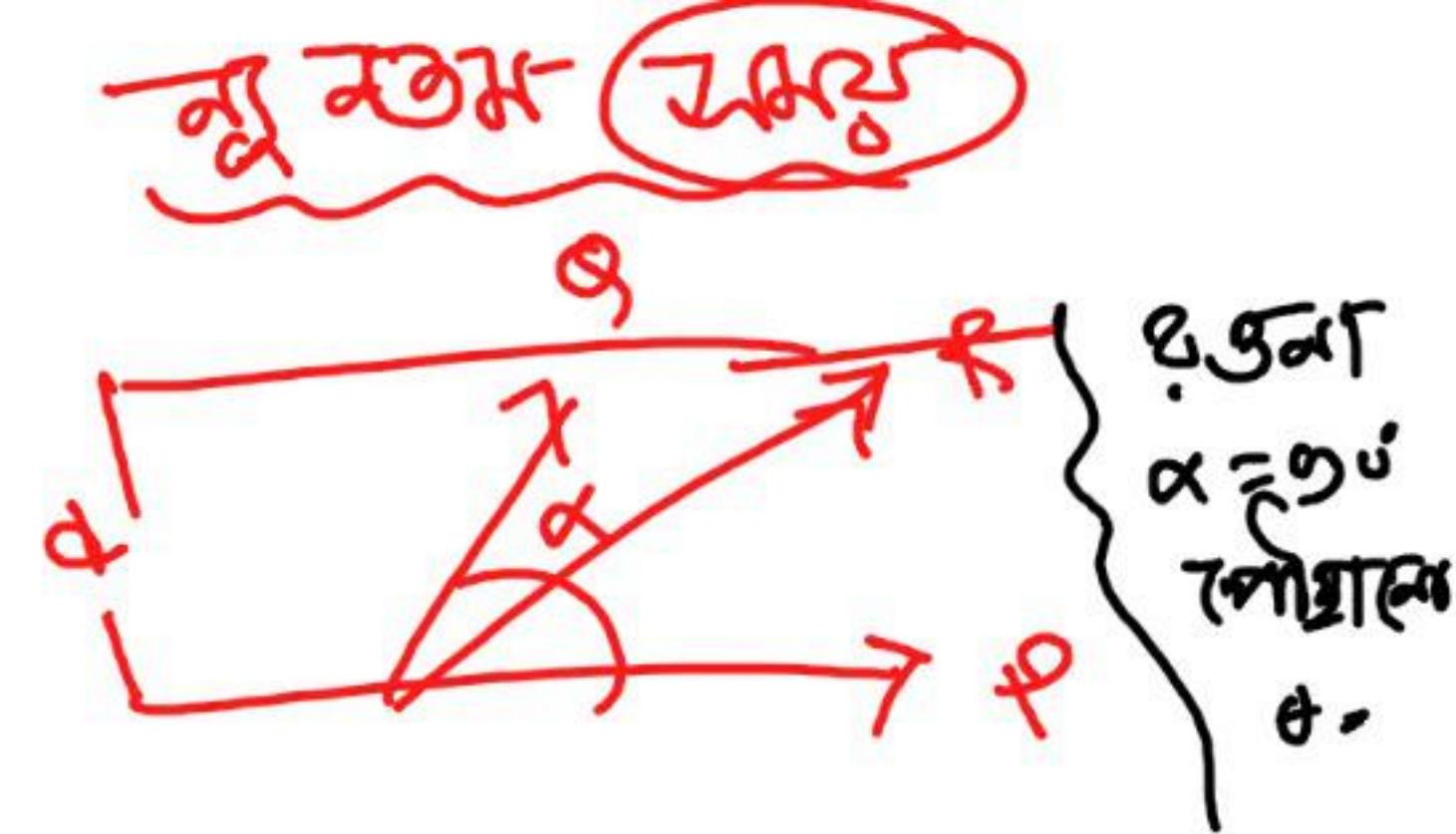


$$\alpha = \cos^{-1}(-p/q)$$

$$ii) R = \sqrt{Q^v - P^v}$$

$$\Rightarrow t = \frac{d}{\sqrt{Nq^r - p^r}}$$

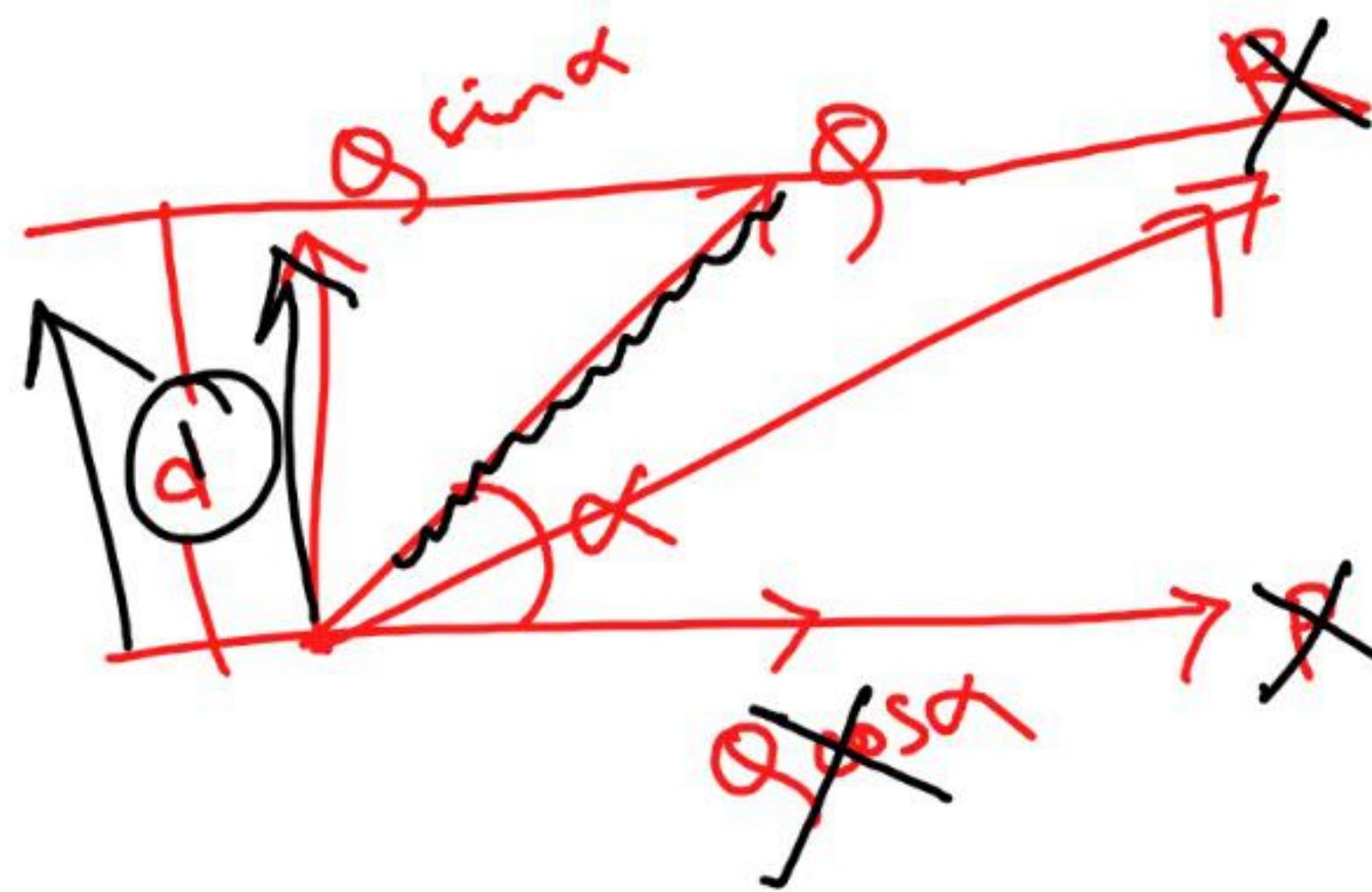
— ప్రాణులు



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$$\Rightarrow R = \sqrt{P^2 + Q^2}$$

$$t = \frac{d}{s}$$



$Q \cdot R$
 Q_{const} , $Q_{sin \alpha}$

$$s = vt$$

$$t = \frac{s}{v}$$

$$\downarrow t = \frac{d}{Q \sin \alpha}$$

$$\sin \alpha = 1$$

$$\alpha = 90^\circ$$

$$t_{min} = \frac{d}{Q}$$