

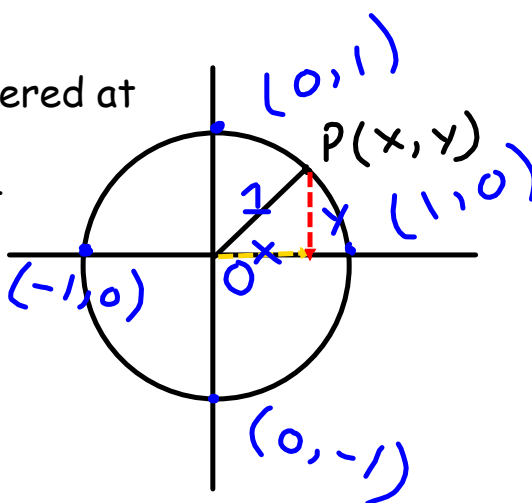
## Trigonometric Circle and Trig Points

- A trigonometric circle is centered at the Origin and has a radius of 1

- Any point  $P(x,y)$  on this circle is called a trigonometric point.

if  $P(x,y)$ , it follows that

$$x^2 + y^2 = 1$$



Proof

$$1^2 = x^2 + y^2$$

$$1 = x^2 + y^2$$

$$x^2 + y^2 = 1$$

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Q 4:

$P\left(\frac{a-4}{13}, \frac{a+3}{13}\right)$  is a trig point.

Find  $a$ ?

$$\left(\frac{a-4}{13}\right)^2 + \left(\frac{a+3}{13}\right)^2 = 1$$

$$\frac{a^2 - 8a + 16}{169} + \frac{a^2 + 6a + 9}{169} = 1$$

$$\frac{a^2 - 8a + 16 + a^2 + 6a + 9}{169} = 1$$

$$\frac{2a^2 - 2a + 25}{169} = 1 \quad (\text{cross } \times)$$

$$\leftarrow$$
$$2a^2 - 2a + 25 = 169$$

$$2a^2 - 2a - 144 = 0$$

$$a^2 - a - 72 = 0$$

$$a^2 - 9a + 8a - 72 = 0$$

$$a(a-9) + 8(a-9) = 0$$

$$(a-9)(a+8) = 0$$

$$\boxed{a=9 \quad a=-8}$$

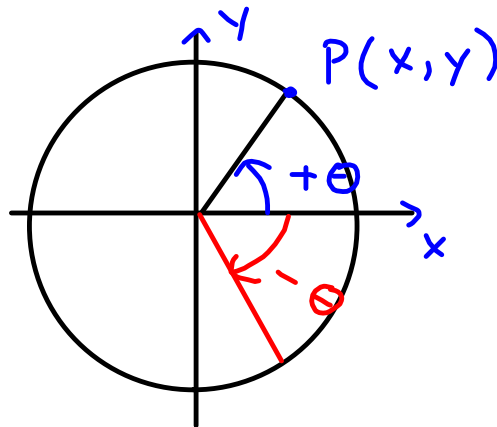
# Locating a Trig Point

If the angle is positive, it

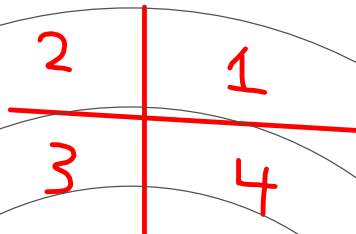
goes counter-clockwise

If the angle is negative, it

goes clockwise

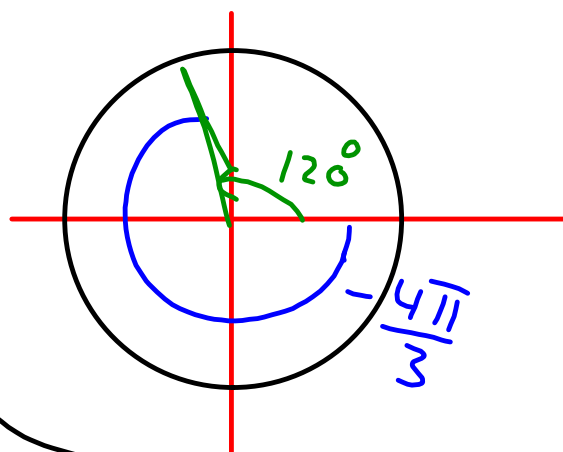


Quadrants  
by number

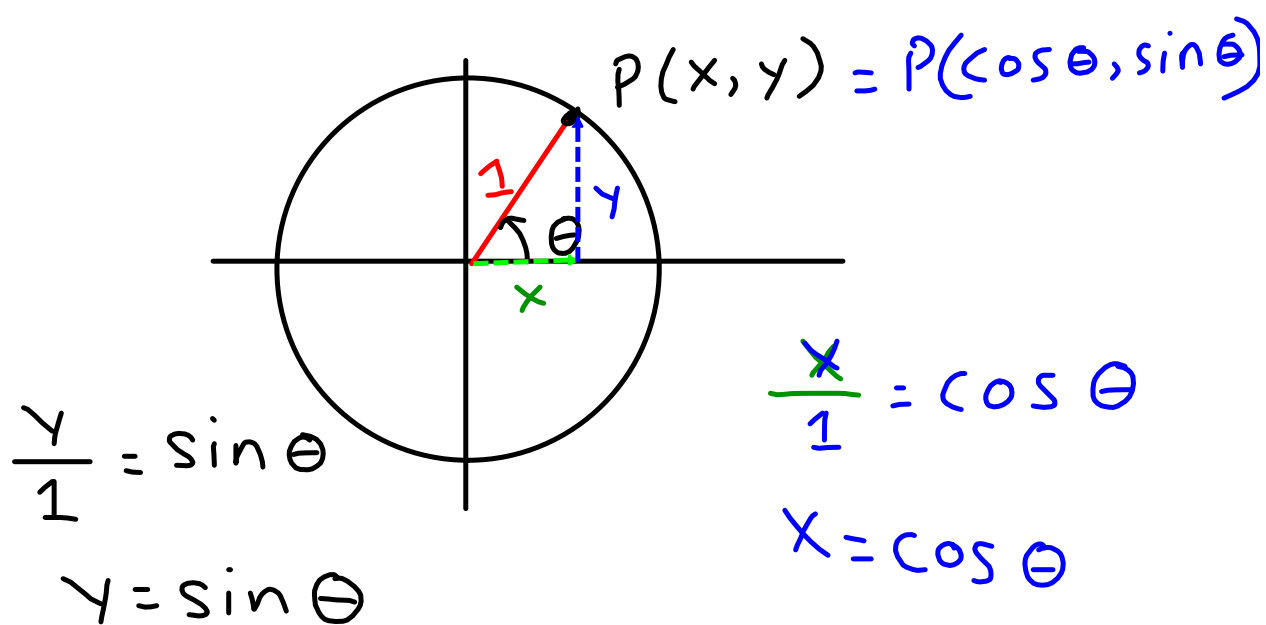


Locate the following trig angles  
on a circle

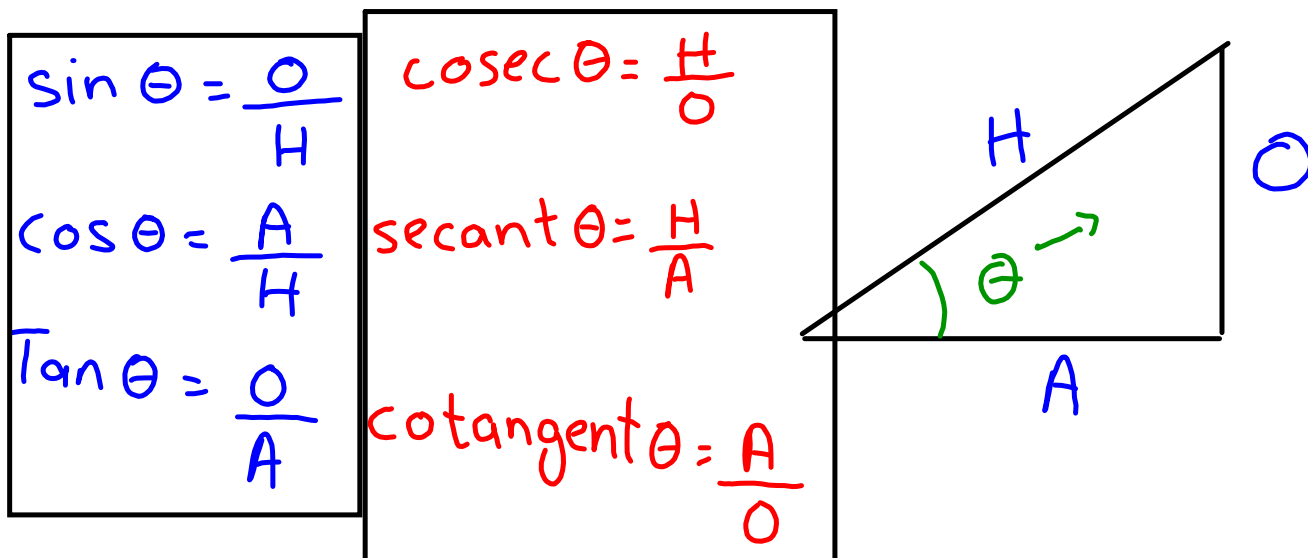
$P(135)$ ,  $P(-120)$ ,  $P(\frac{\pi}{3})$ ,  $P(-\frac{4\pi}{3})$



Act 4  
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## SOH - CAH - TOA



Therefore .

$$\sin \theta = \frac{1}{\operatorname{csc} \theta}$$

$$\operatorname{csc} \theta = \frac{1}{\sin \theta}$$

$$\cos \theta = \frac{1}{\operatorname{sec} \theta}$$

$$\operatorname{sec} \theta = \frac{1}{\cos \theta}$$

$$\tan \theta = \frac{1}{\operatorname{cot} \theta}$$

$$\operatorname{cot} \theta = \frac{1}{\tan \theta}$$

Claim:

$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

Proof:-

$$\sin \theta = \frac{O}{H} \quad \cos \theta = \frac{A}{H}$$

$$\therefore \frac{\sin \theta}{\cos \theta} = \frac{\frac{O}{H}}{\frac{A}{H}} = \frac{O}{H} \div \frac{A}{H}$$

p207  
Ex Q24  
(a)

$$= \frac{O}{H} \cdot \frac{H}{A} = \frac{O}{A} = \tan \theta$$

$$\tan\left(\frac{2\pi}{3}\right)$$

$$= \frac{\sin \frac{2\pi}{3}}{\cos \frac{2\pi}{3}} = \frac{\frac{\sqrt{3}}{2}}{-\frac{1}{2}} = \frac{\sqrt{3}}{2} \cdot \frac{-2}{1} = \boxed{-\sqrt{3}}$$

Finish p207