

What's Going On?

Checking In

Minds on

Angles in Standard Position

Action!

Obtuse Angles in Standard Position

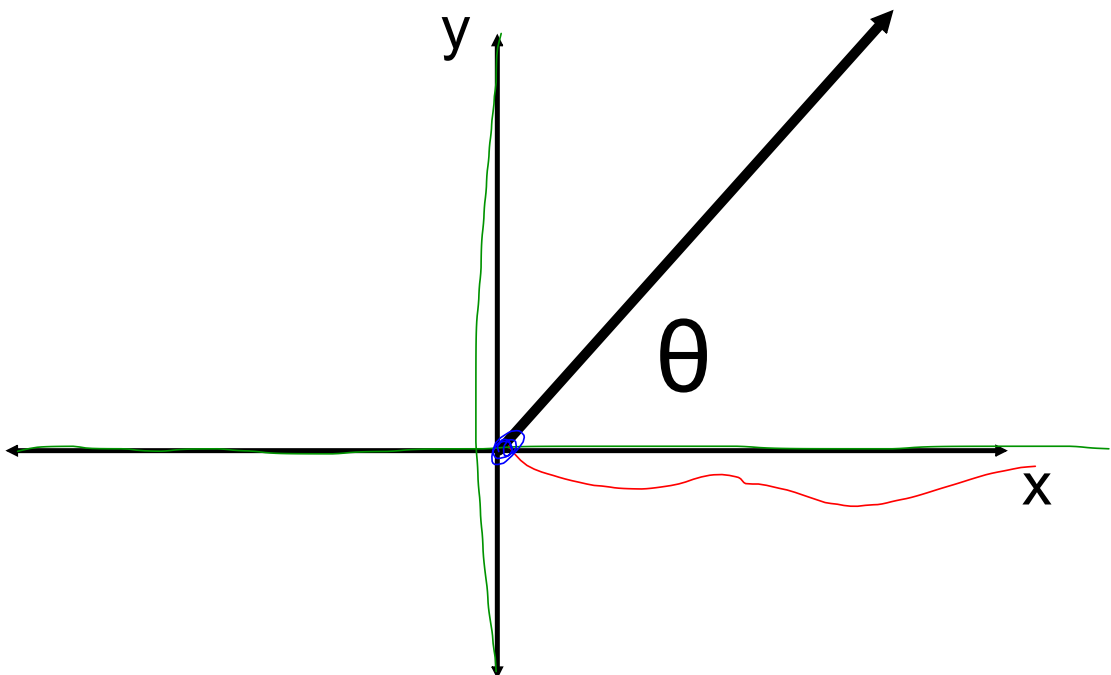
Consolidation

Writing the Ratios

Learning Goal - I will be able to write the trigonometric ratios of acute and obtuse angles in standard position.

Minds on

Angles in Standard Position

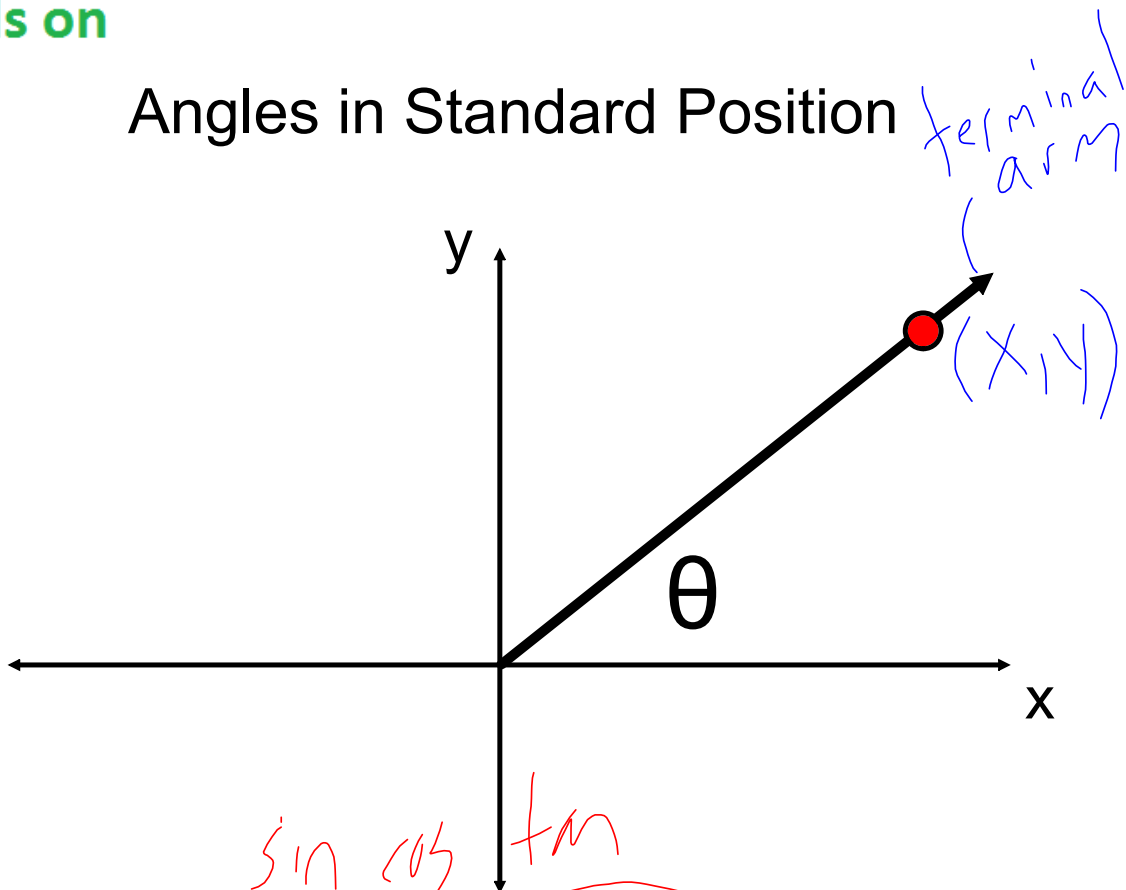


An angle in standard position is measured counter-clockwise about the origin from the positive x-axis on the Cartesian plane.

xy axes

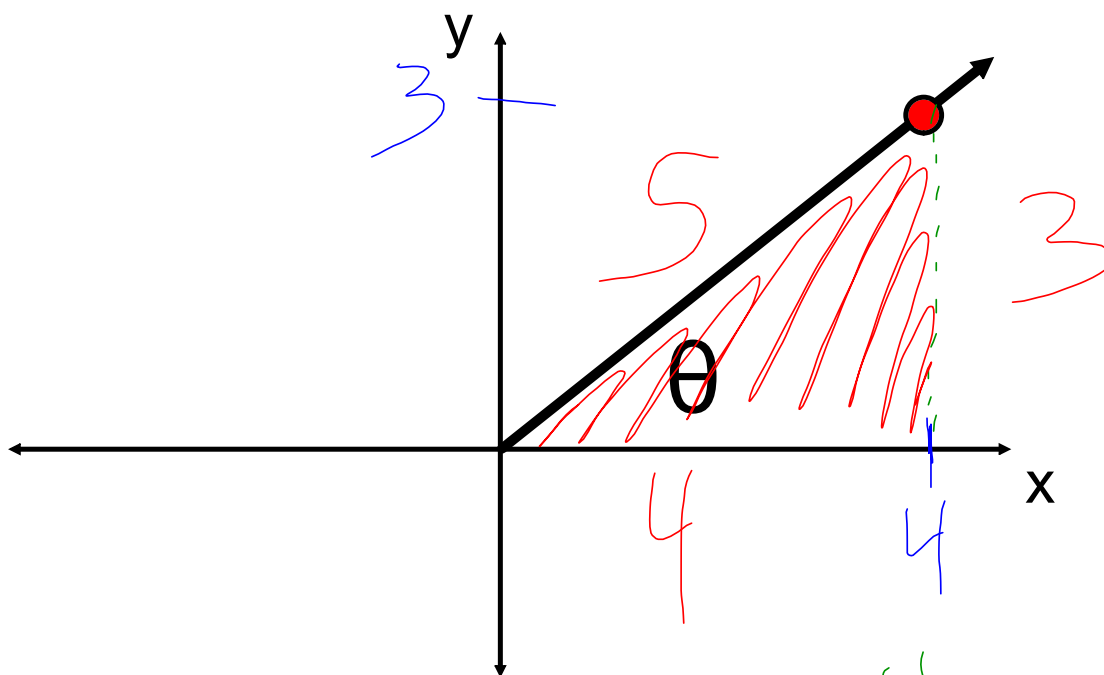
Minds on

Angles in Standard Position



The primary trigonometric ratios of an angle, θ , in standard position are defined in terms of the coordinates of a point, (x, y) .

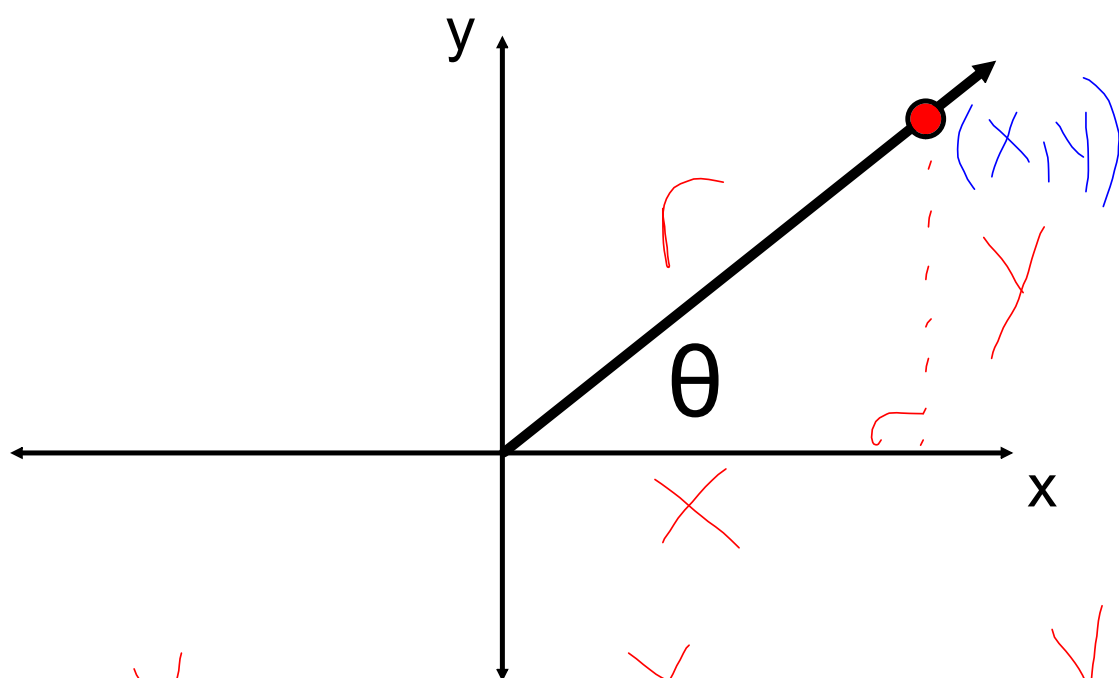
Angles in Standard Position



$$\sin \theta = \frac{3}{5} \quad \cos \theta = \frac{4}{5}$$

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

Angles in Standard Position



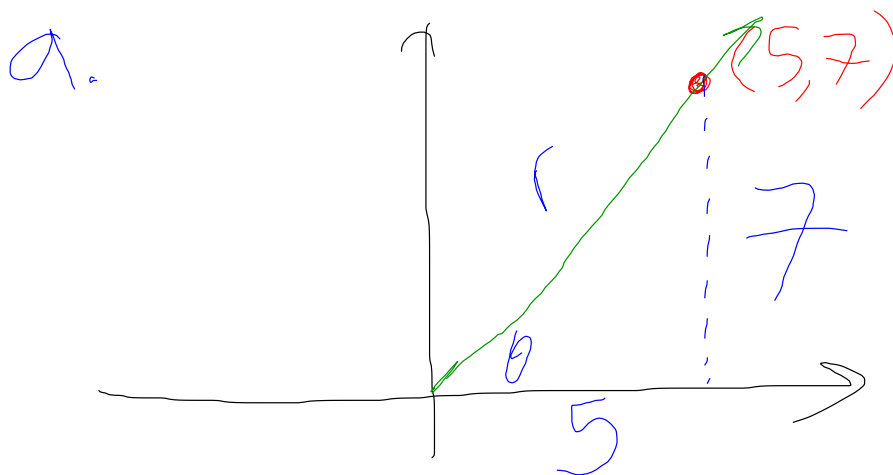
$$\sin \theta = \frac{y}{r}$$

$$\cos \theta = \frac{x}{r}$$

$$\tan \theta = \frac{y}{x}$$

Given the point $P(5, 7)$ that lies on the terminal arm of an angle.

- sketch a diagram of the angle in standard position.
- determine the distance from the origin to the point
- determine the primary trig ratios for the angle
- determine the angle



b.

$$r^2 = 5^2 + 7^2$$

$$r^2 = 25 + 49$$

$$\sqrt{r^2} = \sqrt{74}$$

$$r = 8.6$$

c.

$$\sin \theta = \frac{7}{8.6} \quad \cos \theta = \frac{5}{8.6}$$

$$\tan \theta = \frac{7}{5}$$

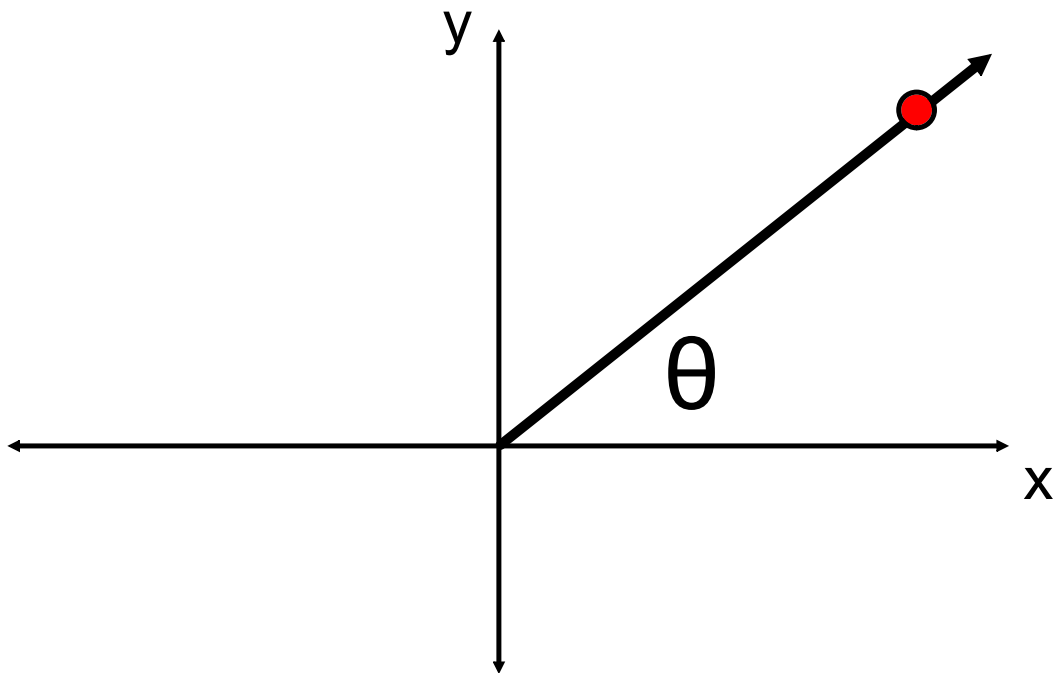
d.

$$\theta = \tan^{-1} \left(\frac{7}{5} \right)$$

$$\theta = 54^\circ$$

Minds on

Angles in Standard Position



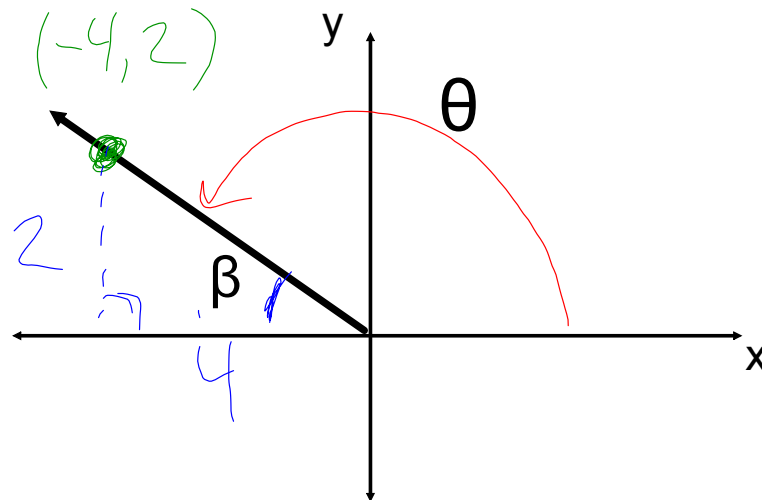
The primary trigonometric ratios are defined as follows:

$$\sin \theta = \frac{y}{r} \quad \cos \theta = \frac{x}{r} \quad \tan \theta = \frac{y}{x}$$

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

Action!

Obtuse Angles in Standard Position



The primary trigonometric ratios of an obtuse angle in standard are measured in the same way as an acute angle in standard position.

The only real difference is that *our x-value is negative.*

$$\tan \beta = \frac{2}{4}$$

$$\beta = 27^\circ$$

$$\theta = 180 - \beta$$

$$\theta = 153^\circ$$

Consolidation

Writing the Ratios

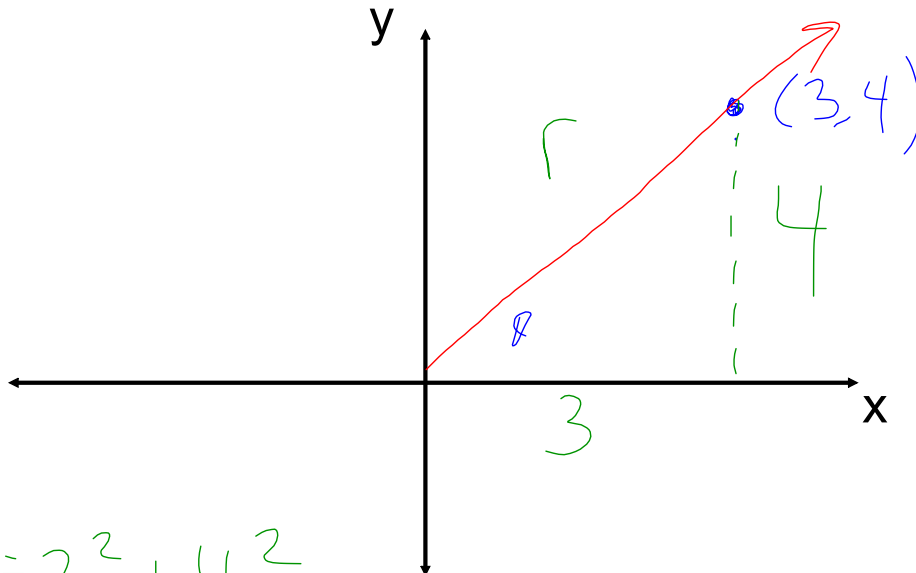
For each given point that lies on the terminal arm of an angle:

- a. Sketch a diagram for the angle in standard position.
- b. Determine the distance from the origin to the point.
- c. Determine the primary trigonometric ratios to four decimal places.
- d. Determine the measure of the angle.

Consolidation

Writing the Ratios

1. Point P (3, 4)



$$r^2 = 3^2 + 4^2$$

$$r^2 = \sqrt{25}$$

$$r = 5$$

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

$$\sin \theta = 0.8$$

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

$$\cos \theta = 0.6$$

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

$$\tan \theta = 1.3333$$

$$\theta = \tan^{-1} \left(\frac{4}{3} \right)$$

$$\theta = 53^\circ$$