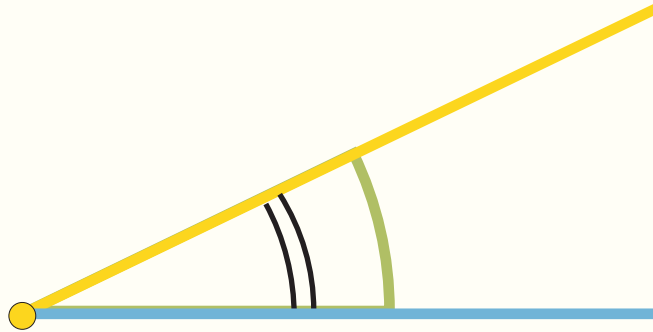


THE TRIGONOMETRY OF ANGLES

- generalized to negative angles

THE MEASUREMENT OF ANGLES

- *from Babylonia (circa 1700 B.C.)
to England (circa 1714)*



DEGREE MEASURE OF ANGLES

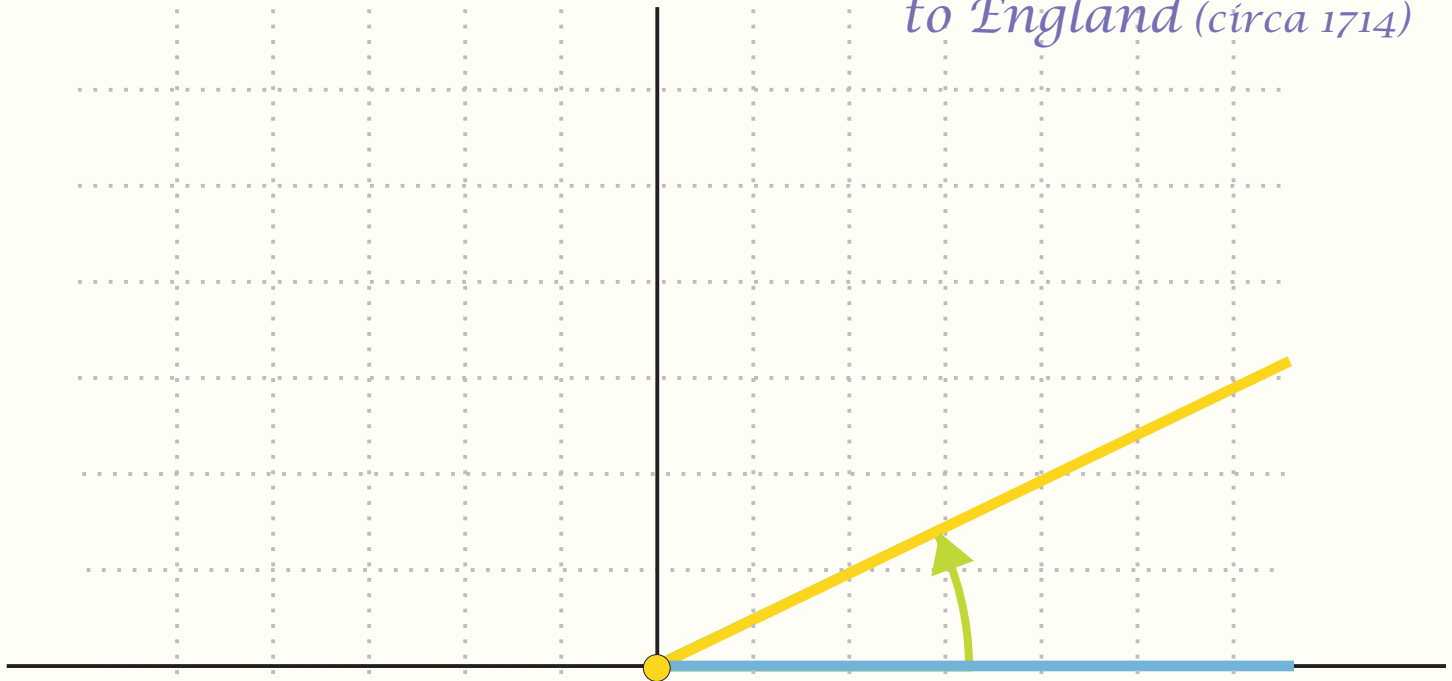
- Rotational measure of an angle from initial arm to terminal arm. Measure of a full rotation in degrees is 360° .

Note that, in the *Euclidean Plane*,
the rotational measure of an angle was oriented only
from its initial arm to its terminal arm.

The choice of the initial one and the terminal one
was probably specified in the context
and the measure of the angle was taken
to be an absolute measure between 0° and 360° .

THE MEASUREMENT OF ANGLES

- *from Babylonia (circa 1700 B.C.)
to England (circa 1714)*



*In the Cartesian Plane, however,
the notion of a standard position of an angle
was introduced with reference to the
origin and the coordinate axes of the plane.*

*This gave rise to an orientation
of the angular measure because
the position of the initial arm
along the positive x-axis of the plane.*

STANDARD POSITION

● Vertex at origin

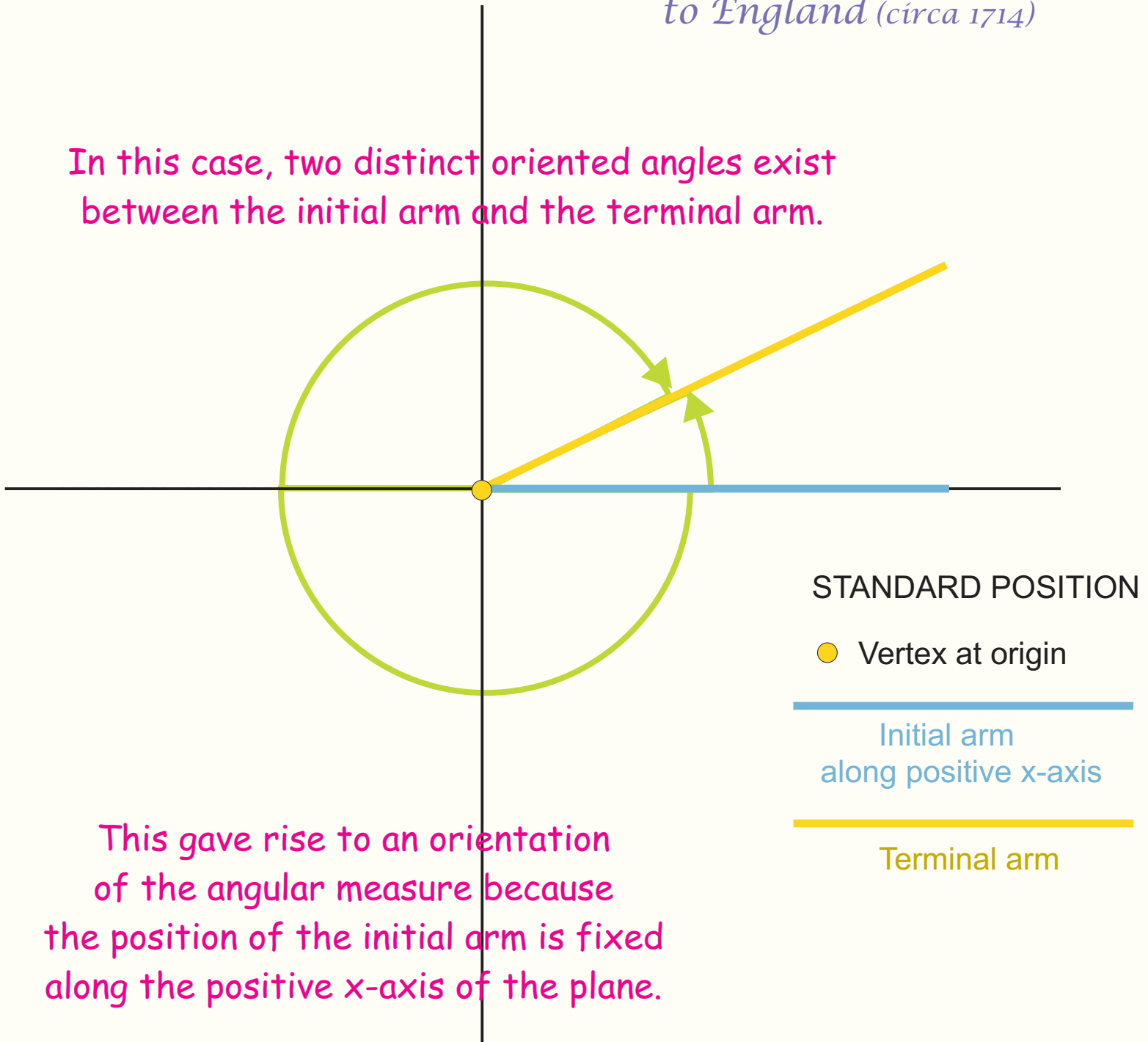
Initial arm
along positive x-axis

Terminal arm

THE MEASUREMENT OF ANGLES

- *from Babylonia (circa 1700 B.C.)
to England (circa 1714)*

In this case, two distinct oriented angles exist
between the initial arm and the terminal arm.

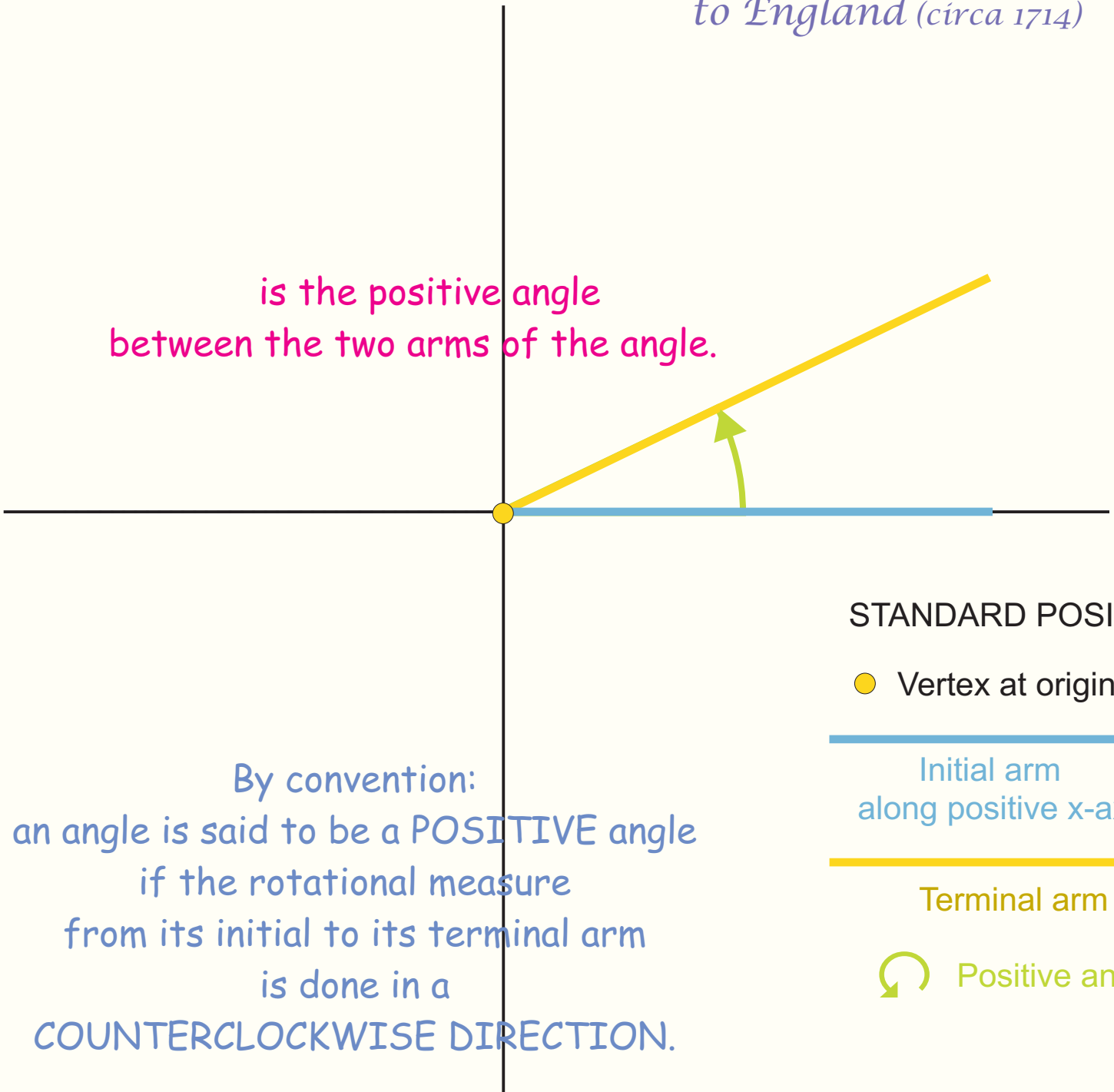


This gave rise to an orientation
of the angular measure because
the position of the initial arm is fixed
along the positive x-axis of the plane.

THE MEASUREMENT OF ANGLES

- *from Babylonia (circa 1700 B.C.)
to England (circa 1714)*

is the positive angle
between the two arms of the angle.



STANDARD POSITION

● Vertex at origin

Initial arm
along positive x-axis

Terminal arm

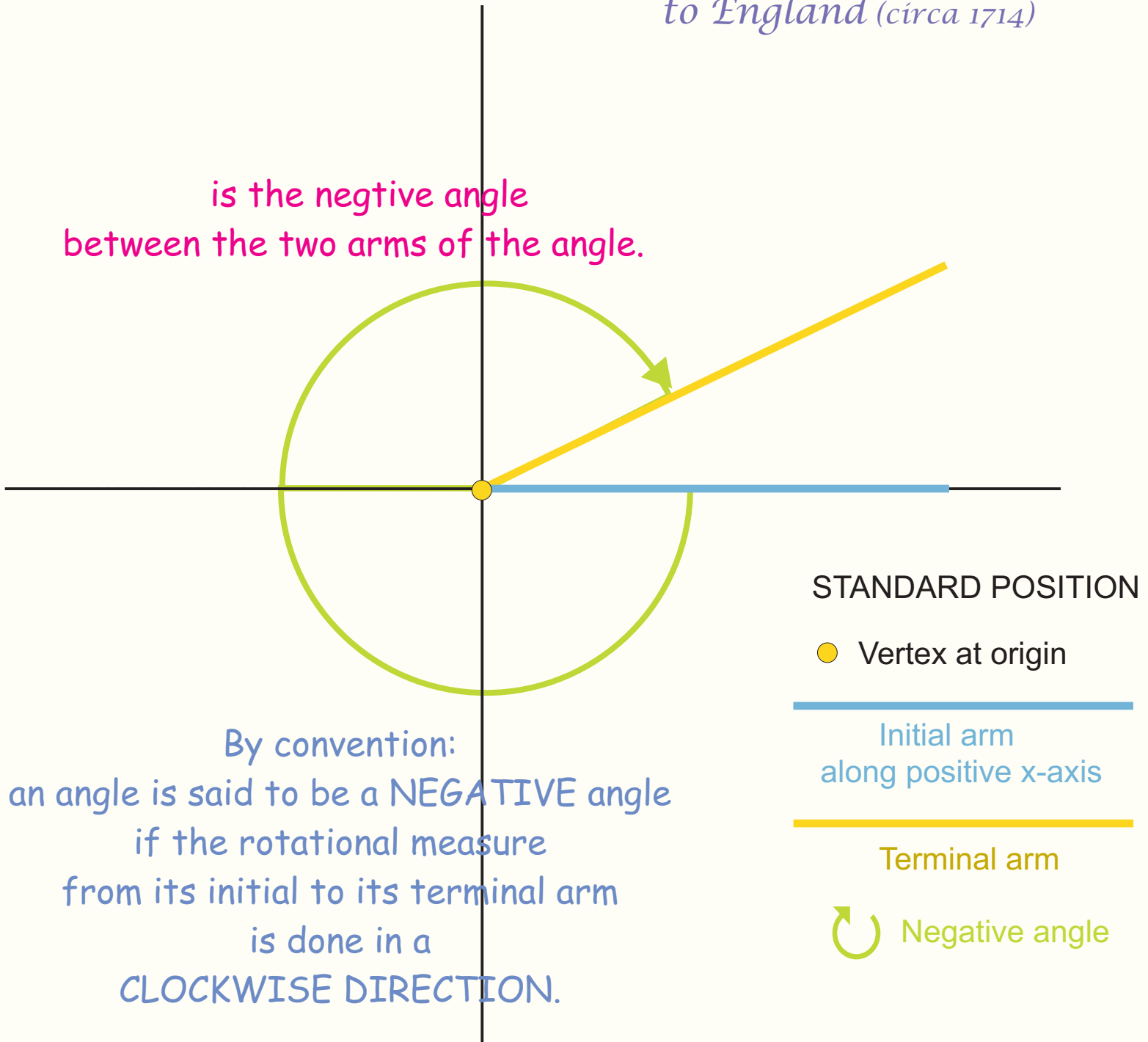
Positive angle

By convention:
an angle is said to be a **POSITIVE** angle
if the rotational measure
from its initial to its terminal arm
is done in a
COUNTERCLOCKWISE DIRECTION.

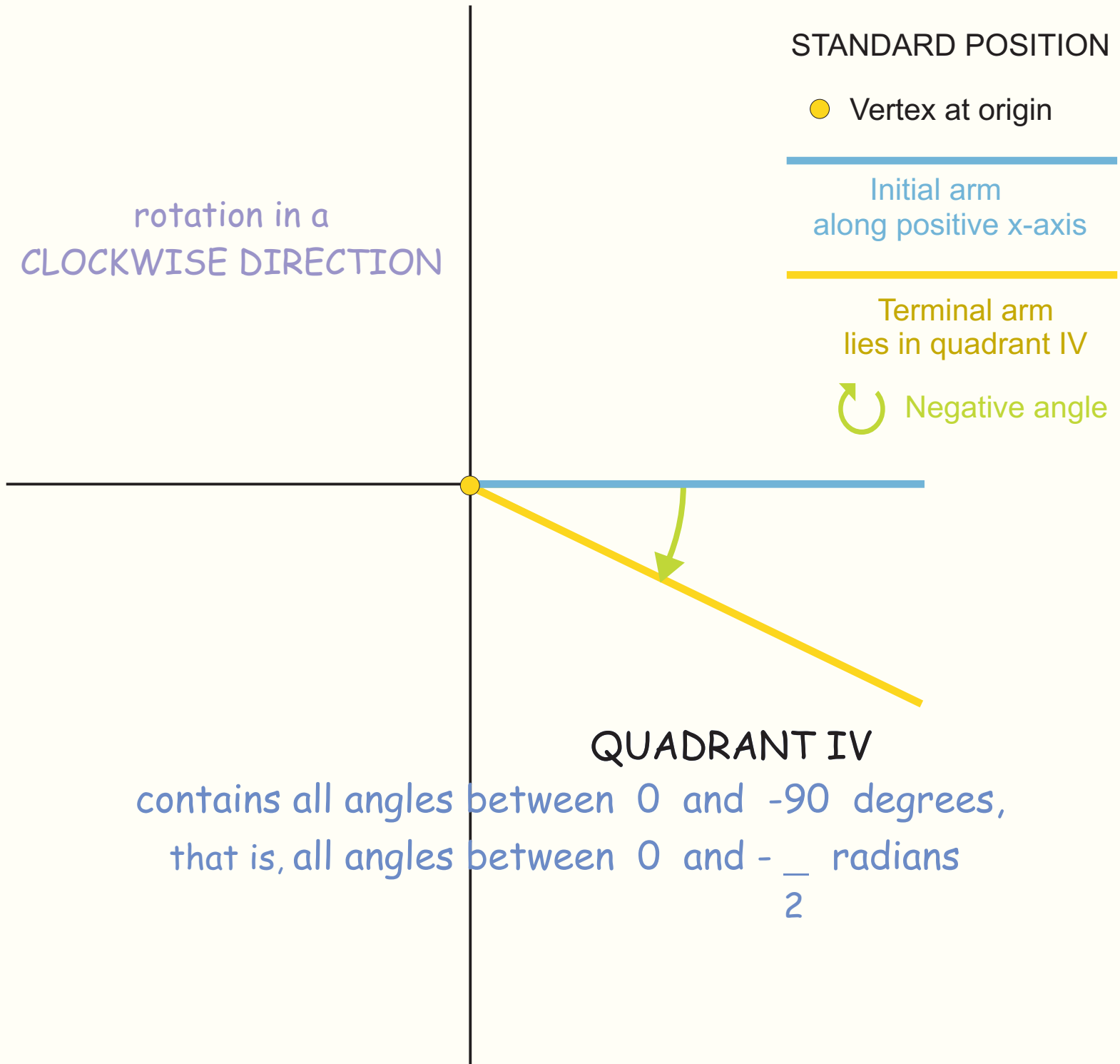
THE MEASUREMENT OF ANGLES

- *from Babylonia (circa 1700 B.C.)
to England (circa 1714)*

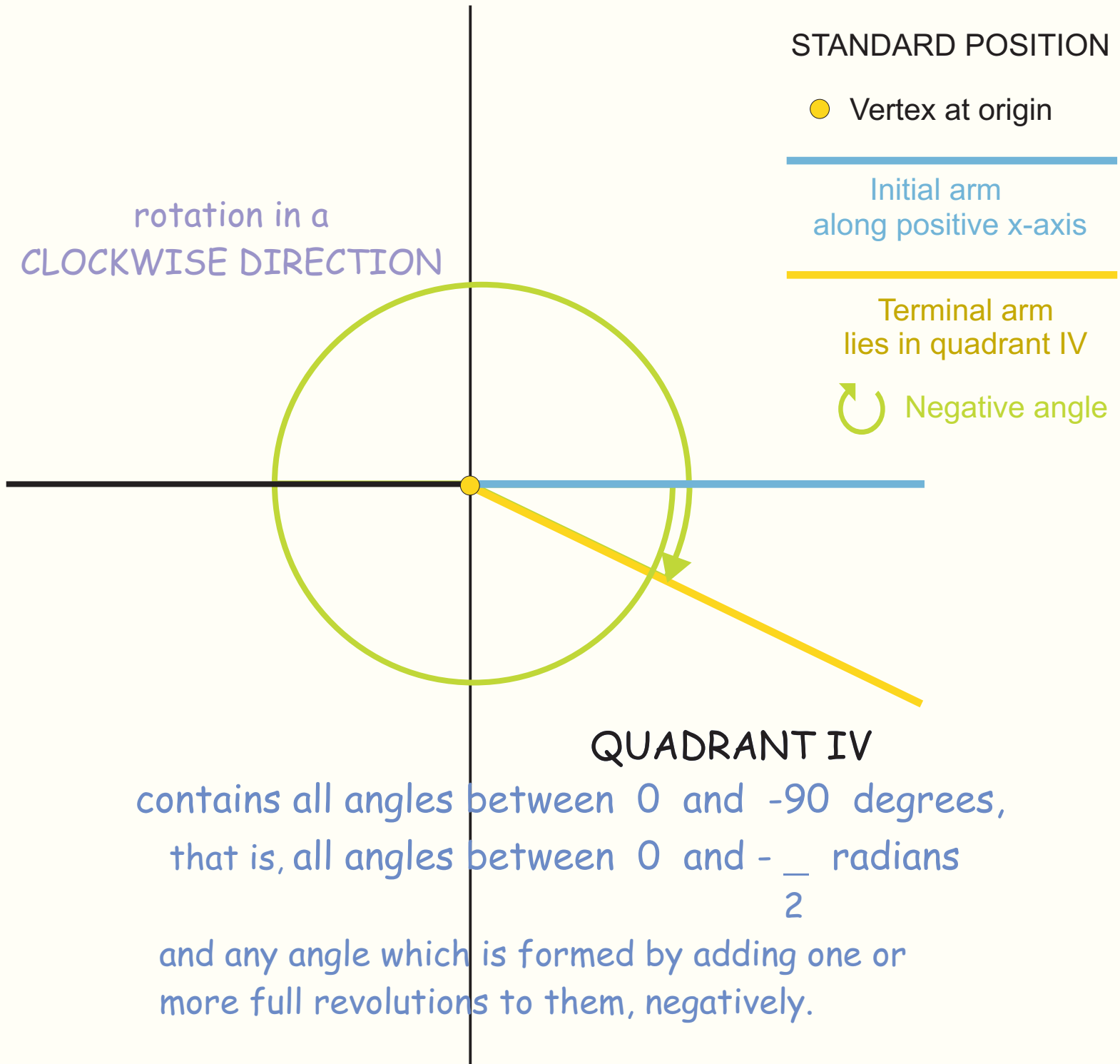
is the negative angle
between the two arms of the angle.



THE TRIGONOMETRIC MEASURE OF NEGATIVE ANGLES

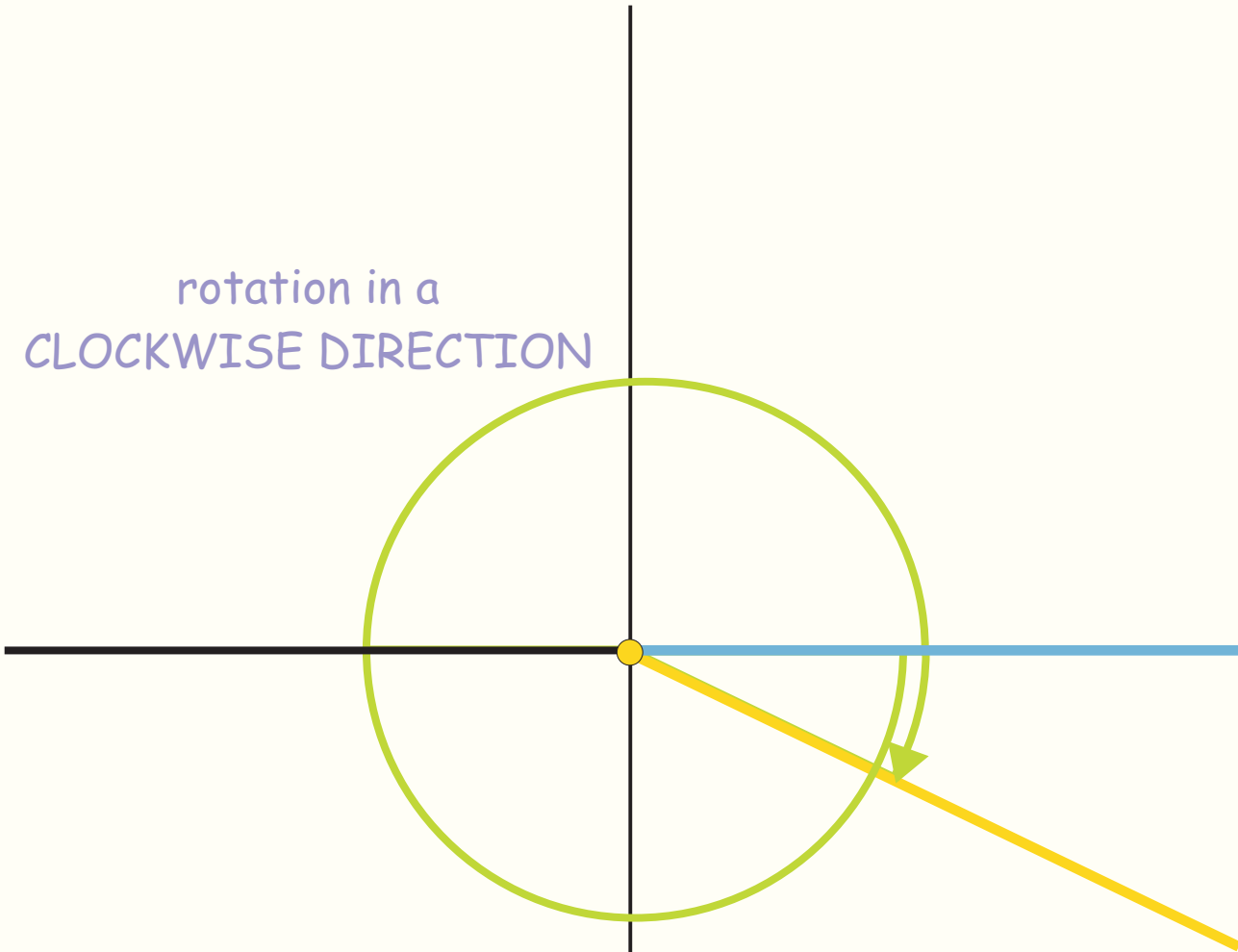


THE TRIGONOMETRIC MEASURE OF NEGATIVE ANGLES



THE TRIGONOMETRIC MEASURE OF NEGATIVE ANGLES

rotation in a
CLOCKWISE DIRECTION



Quadrant IV angles include:

$$-30 - 360 = -390 \text{ degrees, or } -\frac{13}{6} - 2 = -\frac{13}{6} \text{ radians,}$$

$$-45 - 720 = -765 \text{ degrees, or } -\frac{17}{4} - 4 = -\frac{17}{4} \text{ radians,}$$

$$-60 - 360 = -420 \text{ degrees, or } -\frac{7}{3} - 2 = -\frac{7}{3} \text{ radians.}$$

THE TRIGONOMETRIC MEASURE OF NEGATIVE ANGLES

Related angle to
is the acute angle
between its terminal arm
and the nearest extension
of the x-axis.

= -

rotation in a
CLOCKWISE DIRECTION

STANDARD POSITION

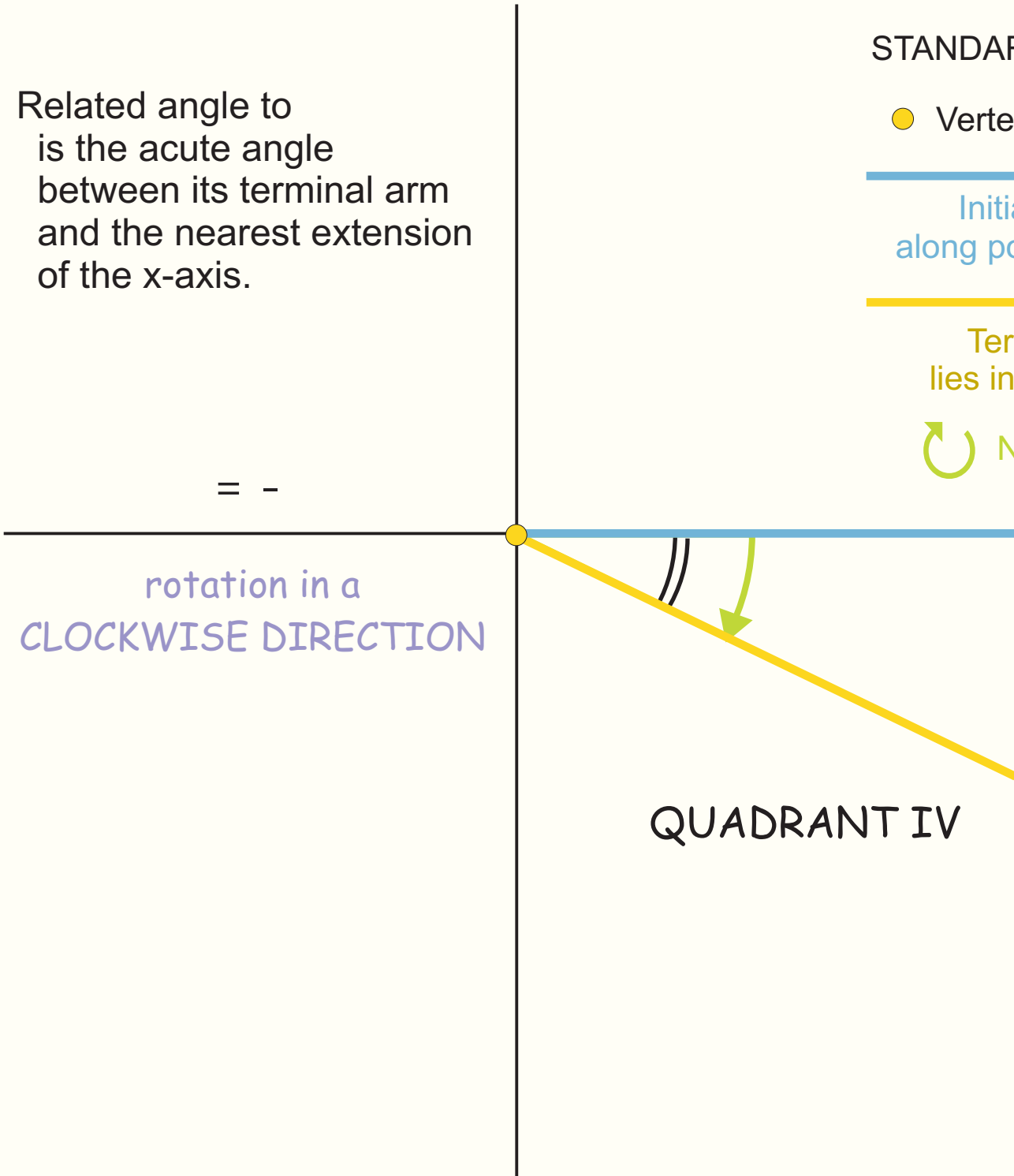
● Vertex at origin

Initial arm
along positive x-axis

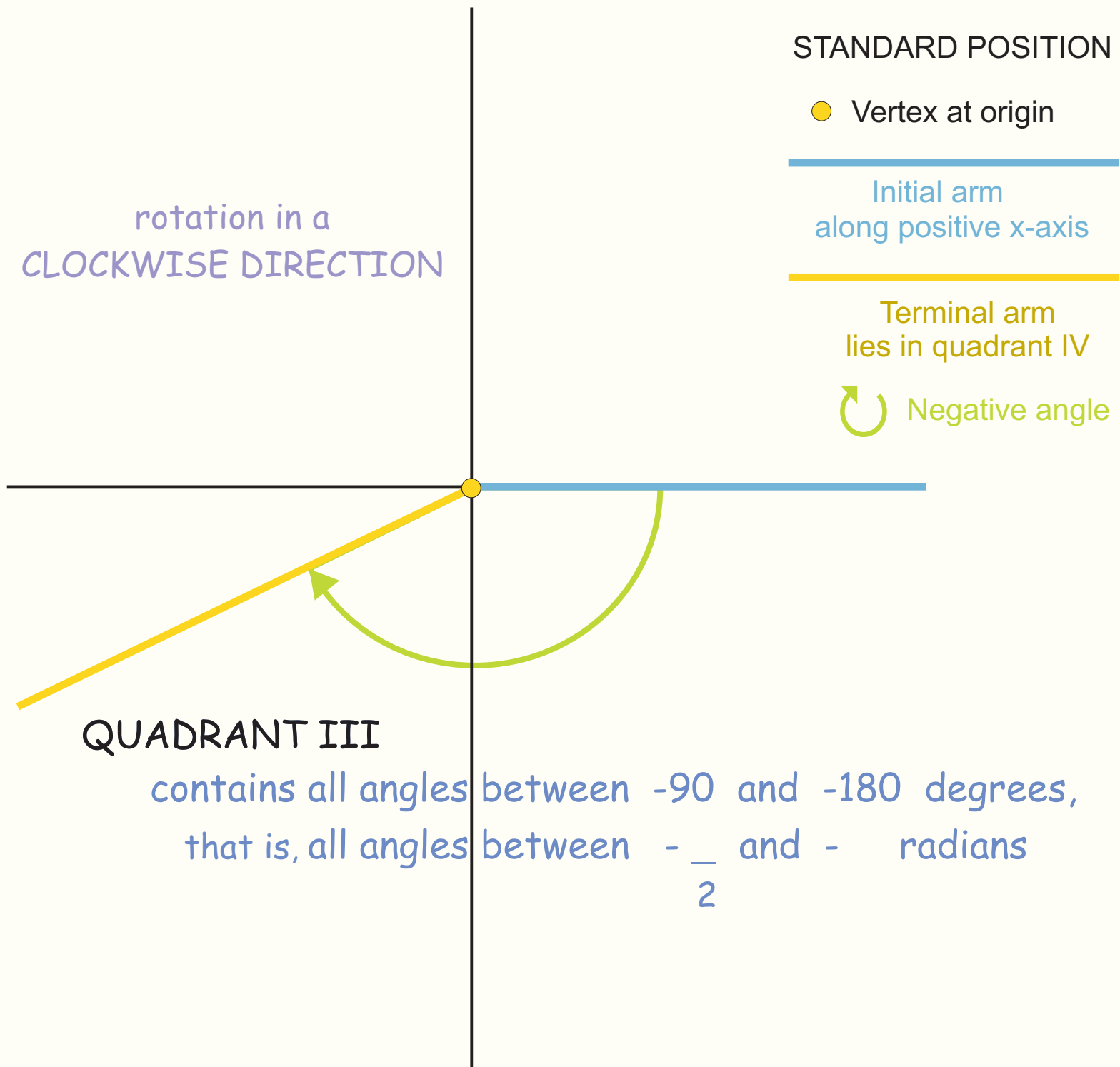
Terminal arm
lies in quadrant IV

↻ Negative angle

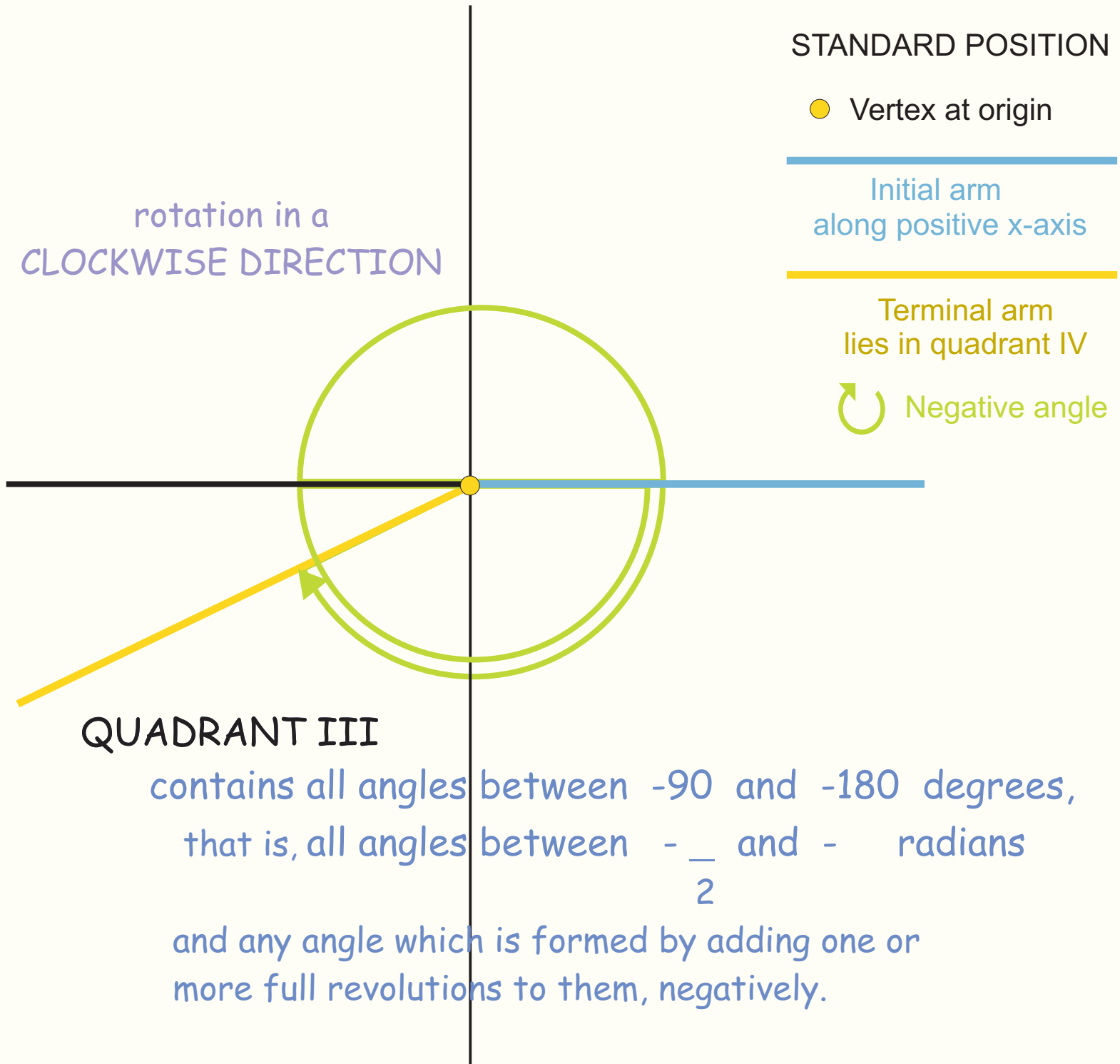
QUADRANT IV



THE TRIGONOMETRIC MEASURE OF NEGATIVE ANGLES

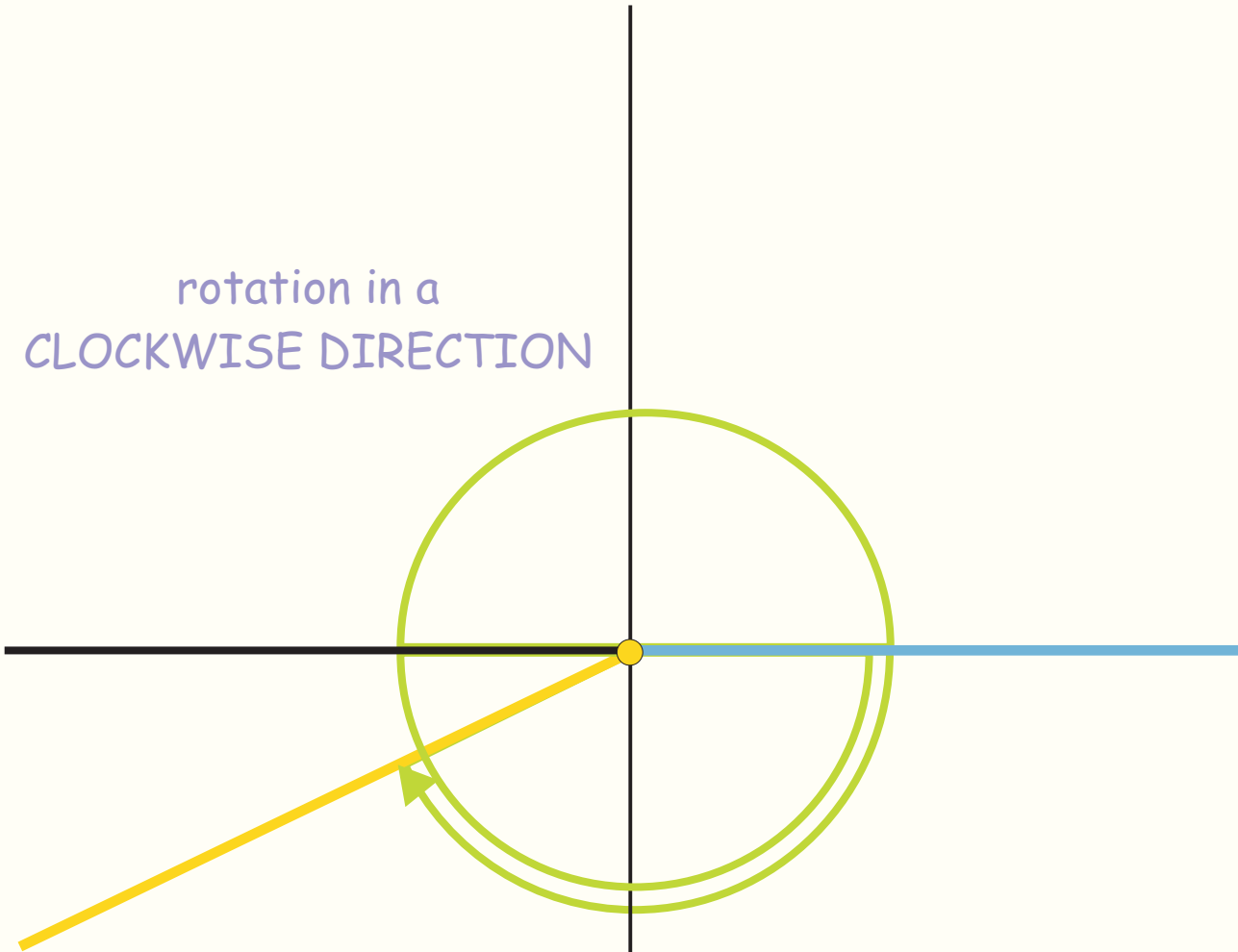


THE TRIGONOMETRIC MEASURE OF NEGATIVE ANGLES



THE TRIGONOMETRIC MEASURE OF NEGATIVE ANGLES

rotation in a
CLOCKWISE DIRECTION



Quadrant III angles include:

$$-120 - 360 = -480 \text{ degrees, or } -\frac{2}{3} - 2 = -\frac{8}{3} \text{ radians,}$$

$$-135 - 360 = -495 \text{ degrees, or } -\frac{3}{4} - 2 = -\frac{11}{4} \text{ radians,}$$

$$-150 - 720 = -870 \text{ degrees, or } -\frac{5}{6} - 4 = -\frac{29}{6} \text{ radians.}$$

THE TRIGONOMETRIC MEASURE OF NEGATIVE ANGLES

Related angle to
is the acute angle
between its terminal arm
and the nearest extension
of the x-axis.

=

STANDARD POSITION

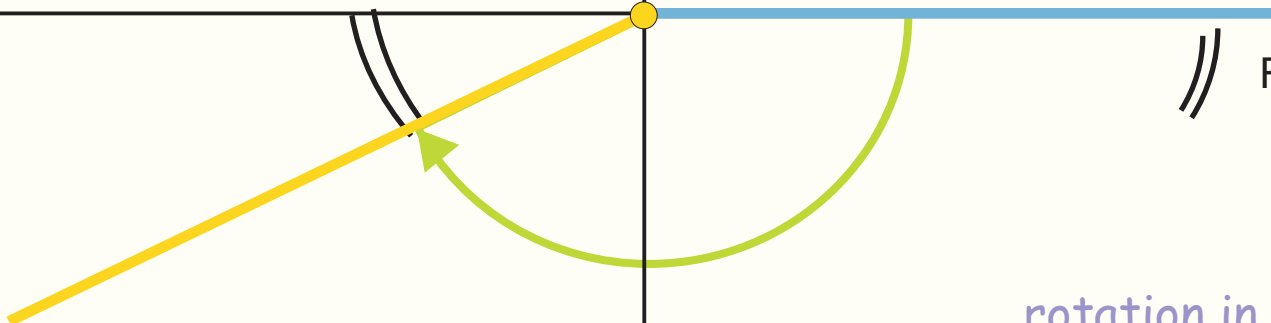
● Vertex at origin

Initial arm
along positive x-axis

Terminal arm
lies in quadrant IV

↻ Negative angle

Related angle

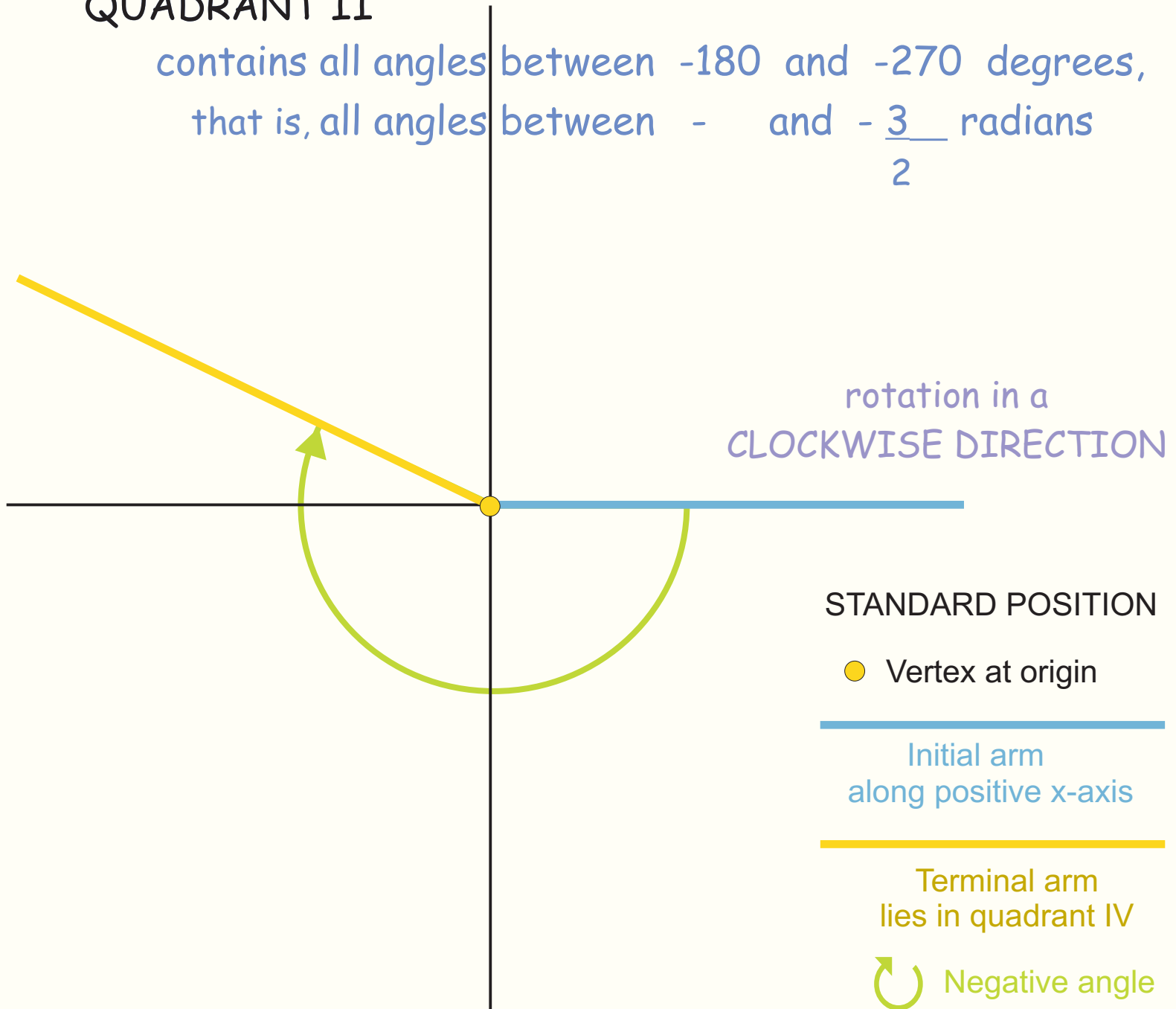


QUADRANT III

rotation in a
CLOCKWISE DIRECTION

QUADRANT II

contains all angles between -180 and -270 degrees,
that is, all angles between $-$ and $-\frac{3}{2}$ radians

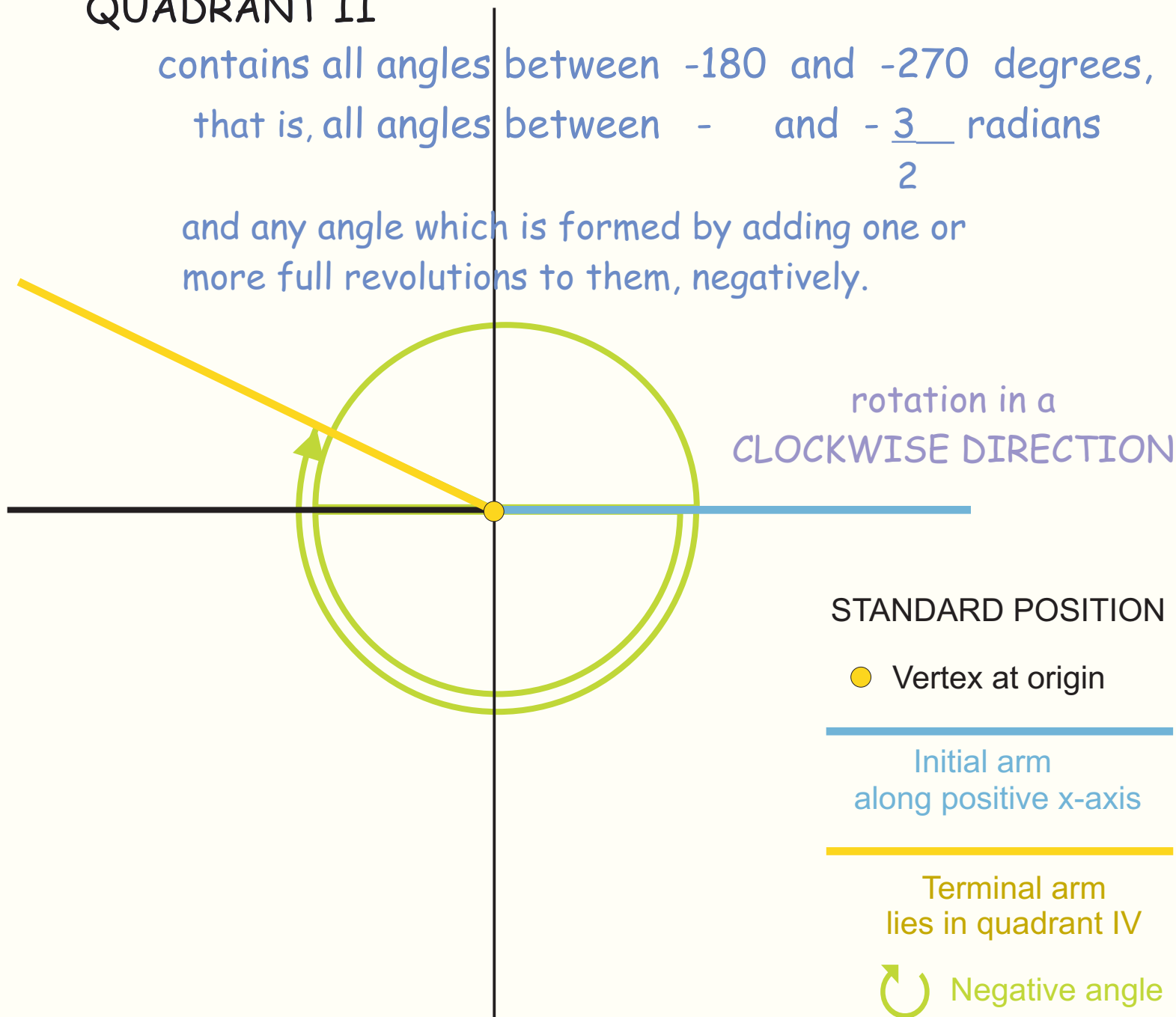


THE TRIGONOMETRIC MEASURE OF NEGATIVE ANGLES

QUADRANT II

contains all angles between -180 and -270 degrees,
that is, all angles between $-$ and $-\frac{3}{2}$ radians

and any angle which is formed by adding one or
more full revolutions to them, negatively.



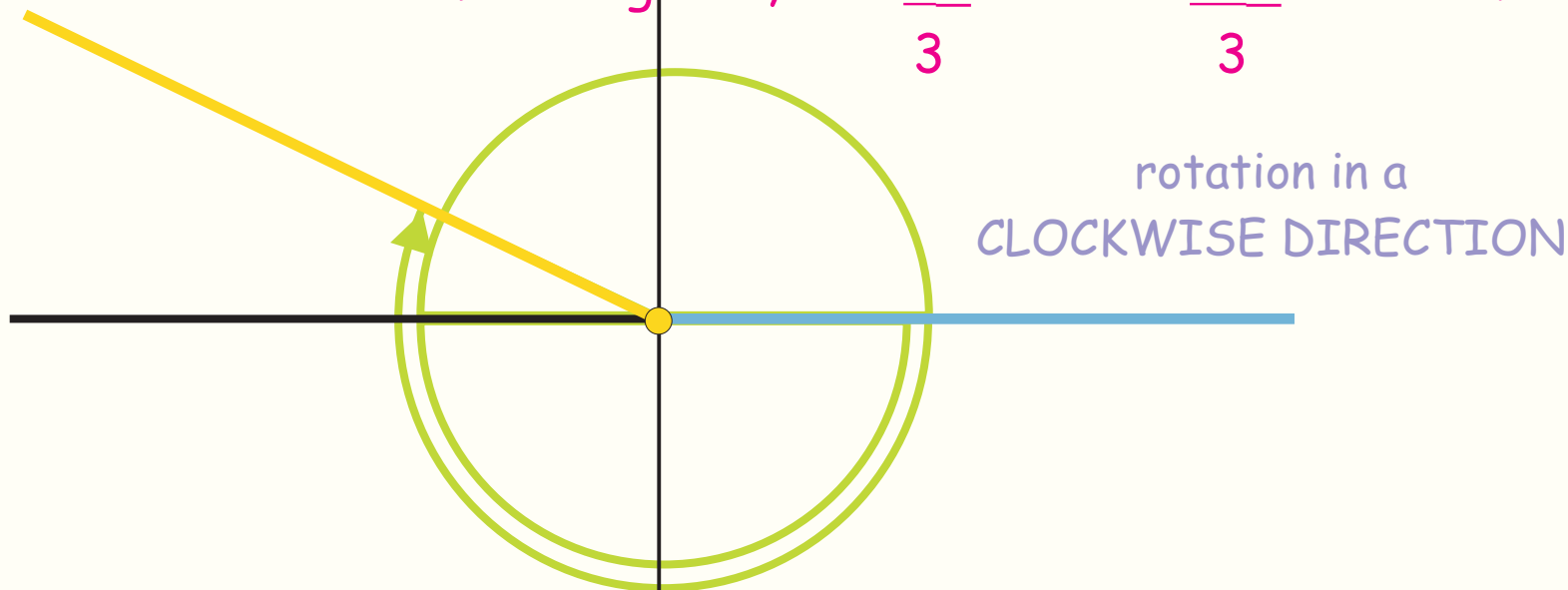
THE TRIGONOMETRIC MEASURE OF NEGATIVE ANGLES

Quadrant II angles include:

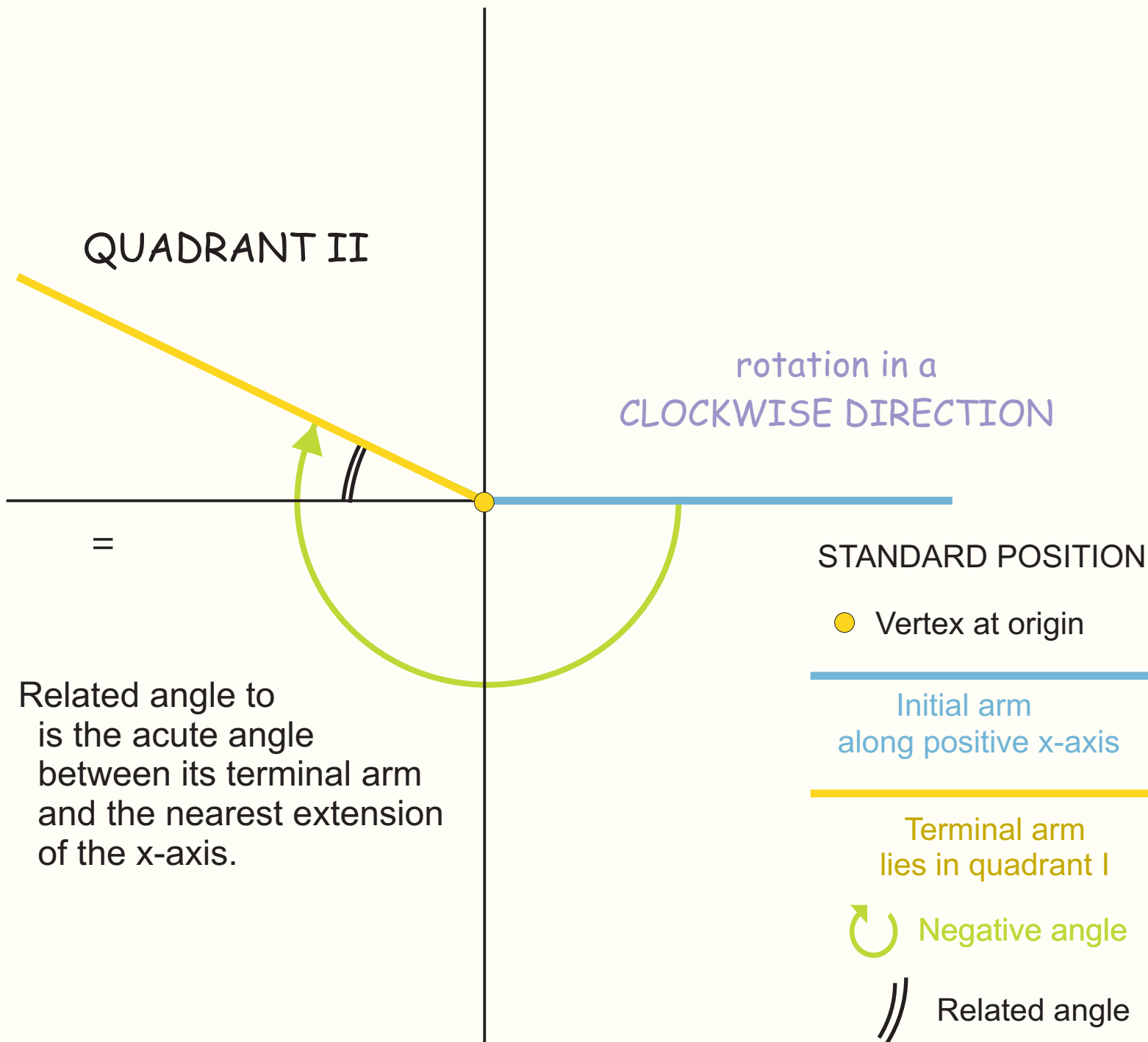
$$-210 - 360 = -570 \text{ degrees, or } -\frac{7}{6} - 2 = -\frac{19}{6} \text{ radians,}$$

$$-225 - 360 = -585 \text{ degrees, or } -\frac{5}{4} - 2 = -\frac{13}{4} \text{ radians,}$$

$$-240 - 720 = -960 \text{ degrees, or } -\frac{4}{3} - 4 = -\frac{16}{3} \text{ radians.}$$



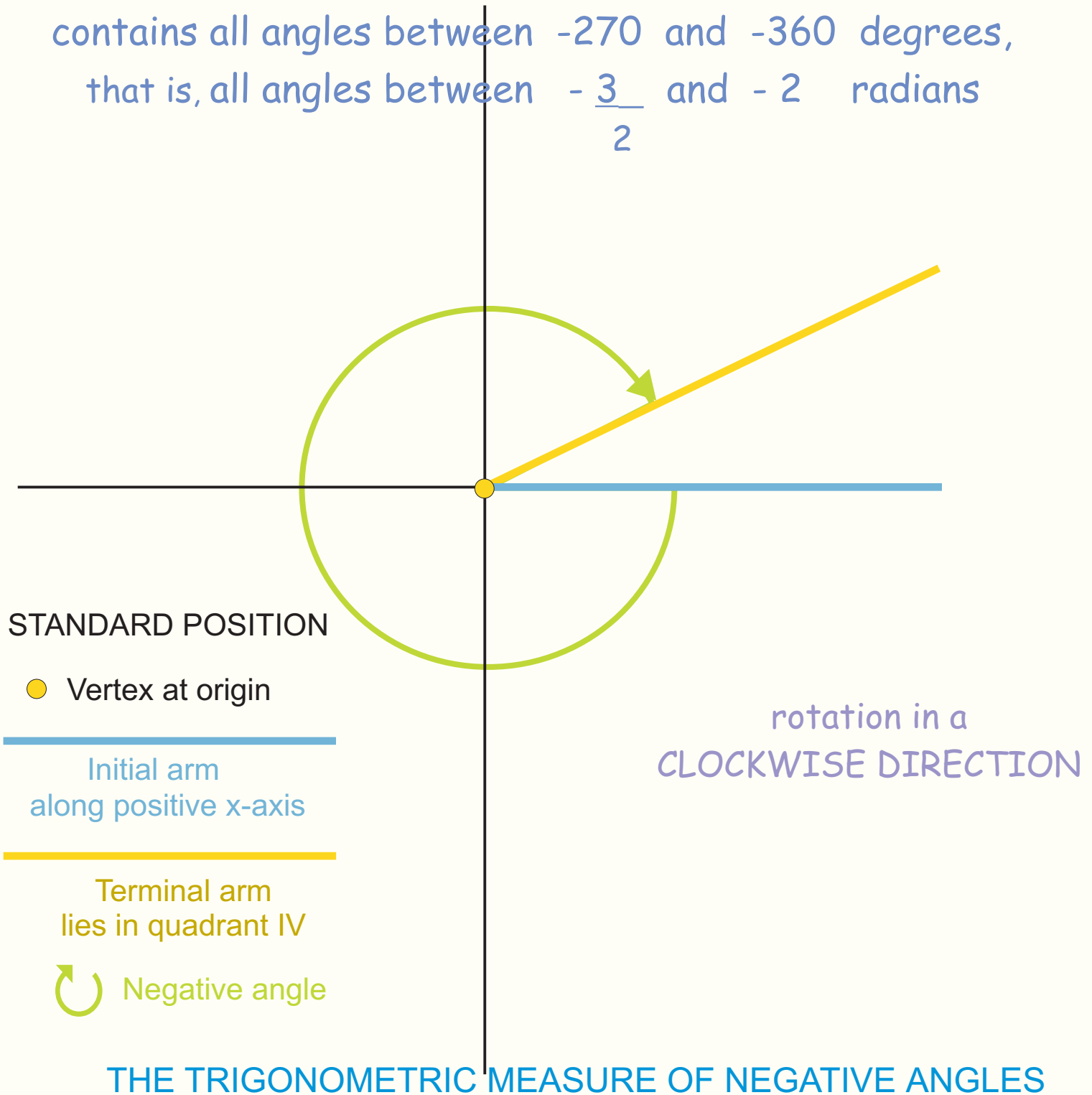
THE TRIGONOMETRIC MEASURE OF NEGATIVE ANGLES



THE TRIGONOMETRIC MEASURE OF NEGATIVE ANGLES

QUADRANT I

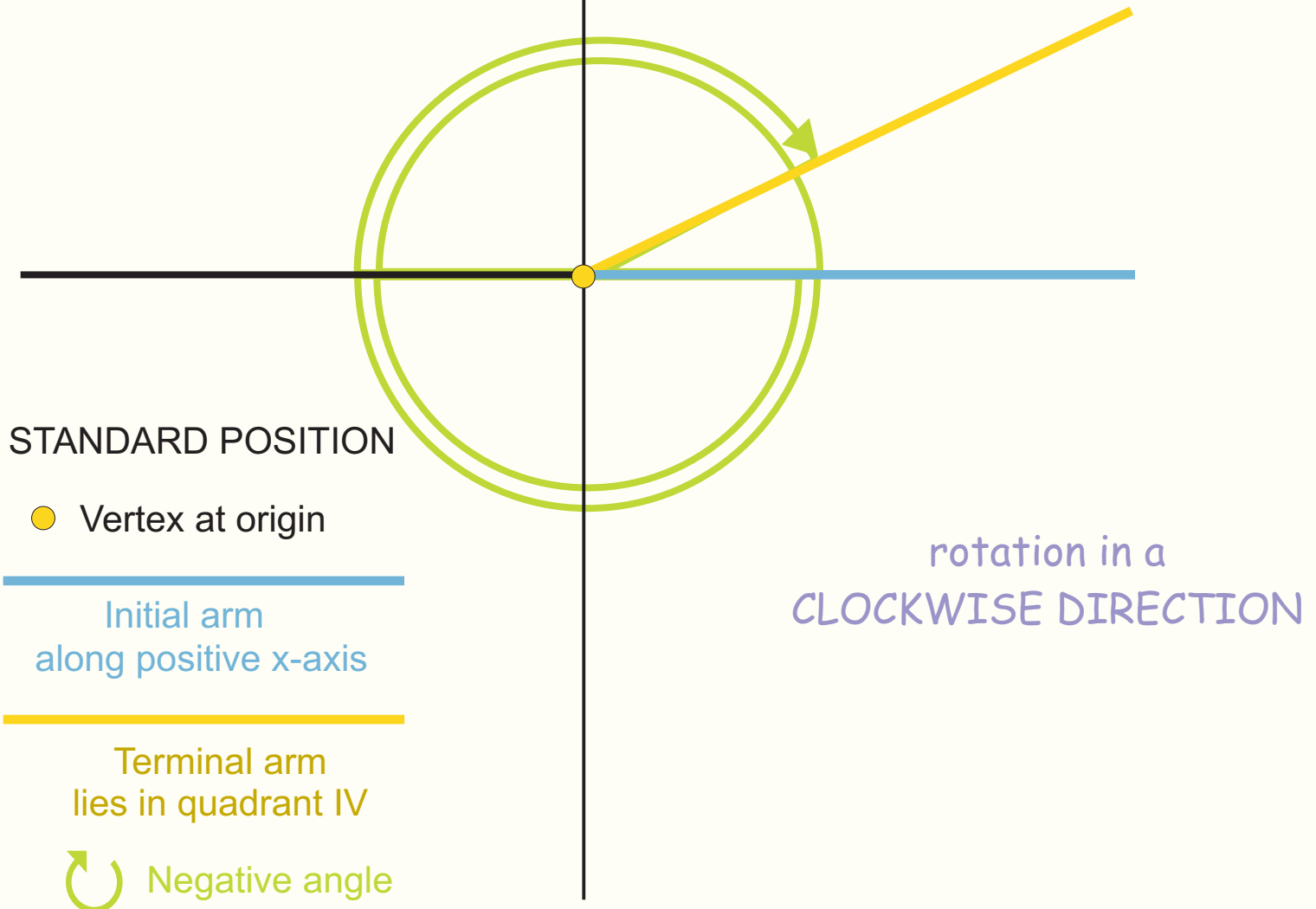
contains all angles between -270 and -360 degrees,
that is, all angles between $-\frac{3}{2}$ and -2 radians



QUADRANT I

contains all angles between -270 and -360 degrees,
that is, all angles between $-\frac{3}{2}$ and -2 radians

and any angle which is formed by adding one or
more full revolutions to them, negatively.



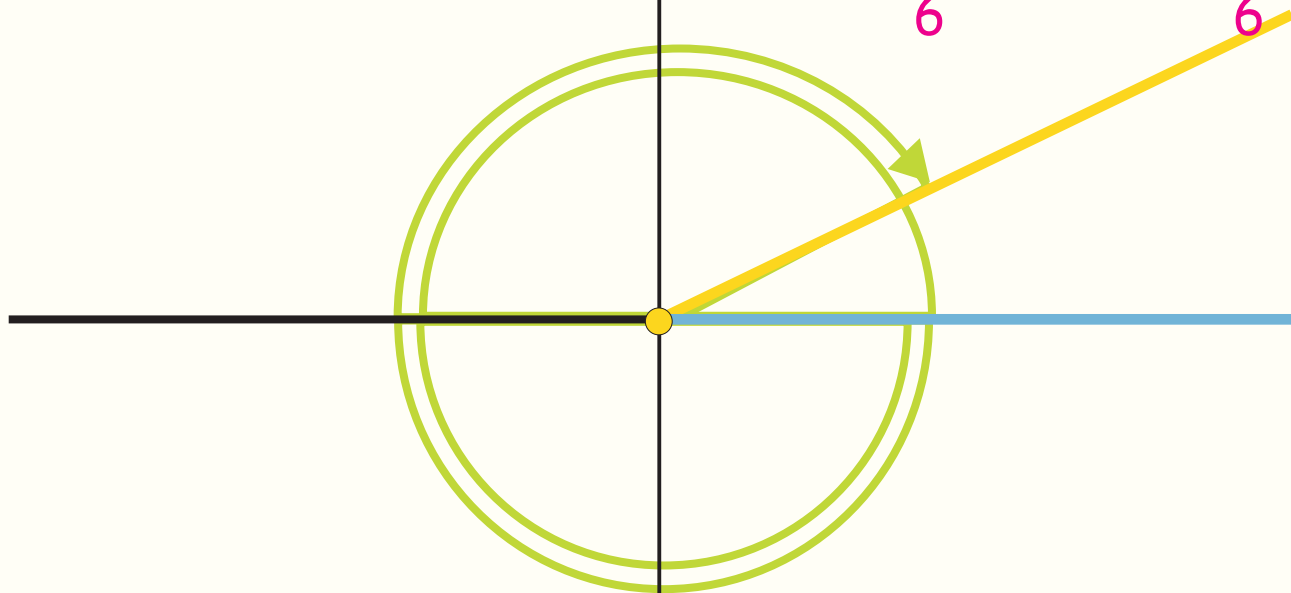
THE TRIGONOMETRIC MEASURE OF NEGATIVE ANGLES

Quadrant I angles include:

$$-300 - 720 = -1020 \text{ degrees, or } -\frac{5}{3} - 4 = -\frac{17}{3} \text{ radians,}$$

$$-315 - 360 = -675 \text{ degrees, or } -\frac{7}{4} - 2 = -\frac{15}{4} \text{ radians,}$$

$$-330 - 360 = -690 \text{ degrees, or } -\frac{11}{6} - 2 = -\frac{23}{6} \text{ radians.}$$

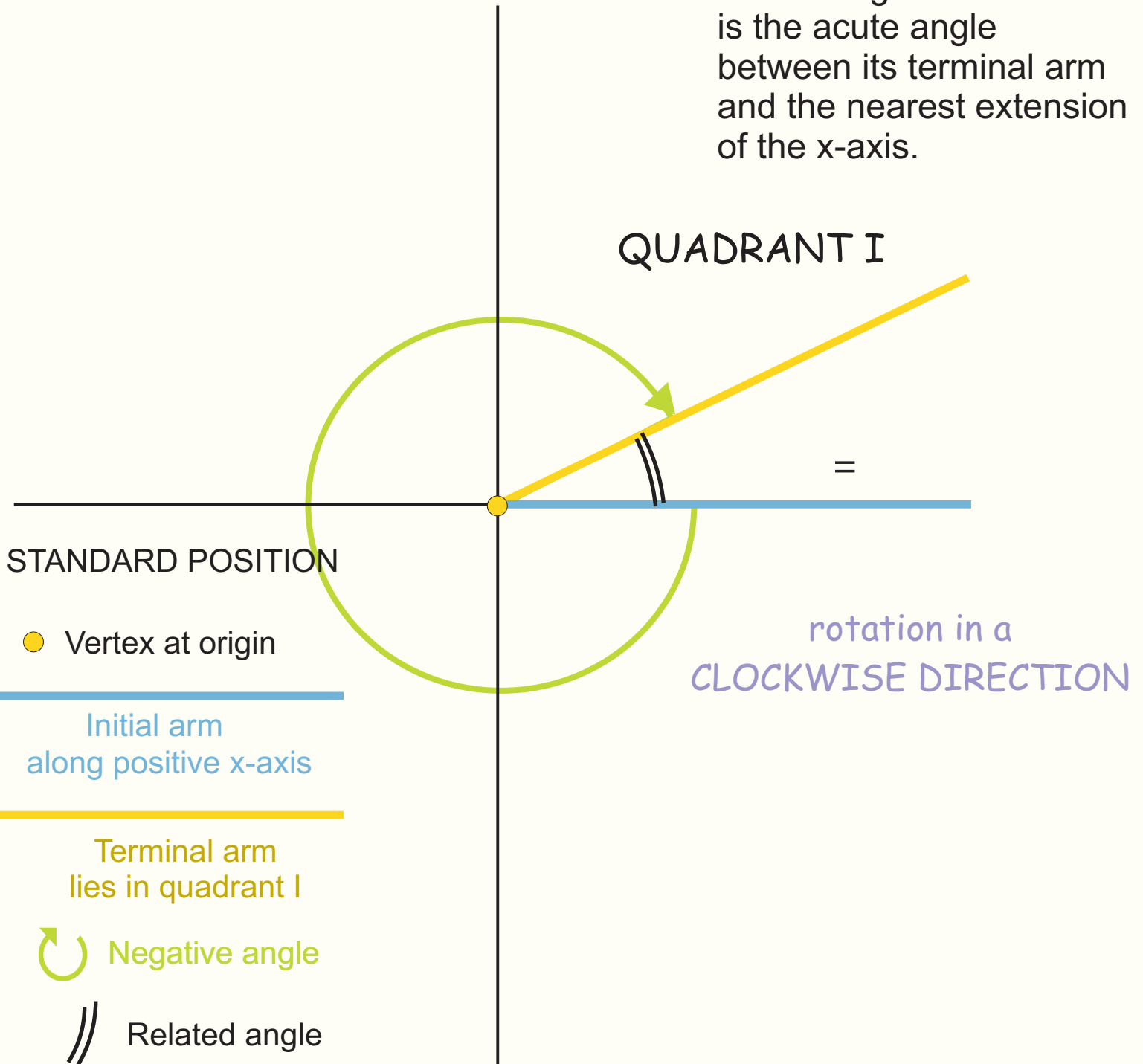


rotation in a
CLOCKWISE DIRECTION

THE TRIGONOMETRIC MEASURE OF NEGATIVE ANGLES

Related angle to
is the acute angle
between its terminal arm
and the nearest extension
of the x-axis.

QUADRANT I

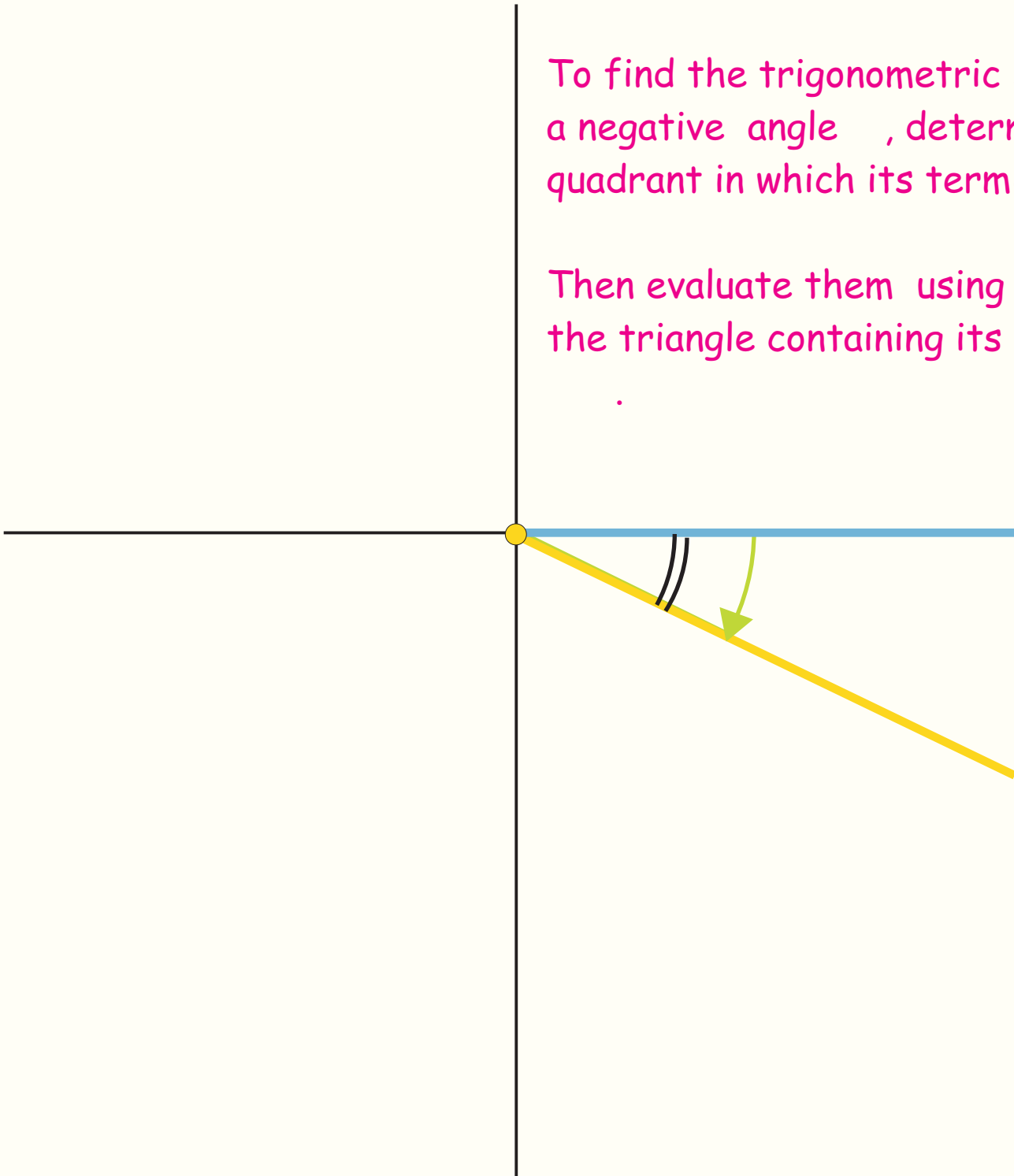


THE TRIGONOMETRIC MEASURE OF NEGATIVE ANGLES

THE TRIGONOMETRIC MEASURE OF NEGATIVE ANGLES

To find the trigonometric measures of a negative angle, determine the quadrant in which its terminal arm lies.

Then evaluate them using the sides of the triangle containing its related angle.



THE TRIGONOMETRIC MEASURE OF NEGATIVE ANGLES

To find the trigonometric measures of a negative angle, determine the quadrant in which its terminal arm lies.

Then evaluate them using the sides of the triangle containing its related angle.

sine of an angle

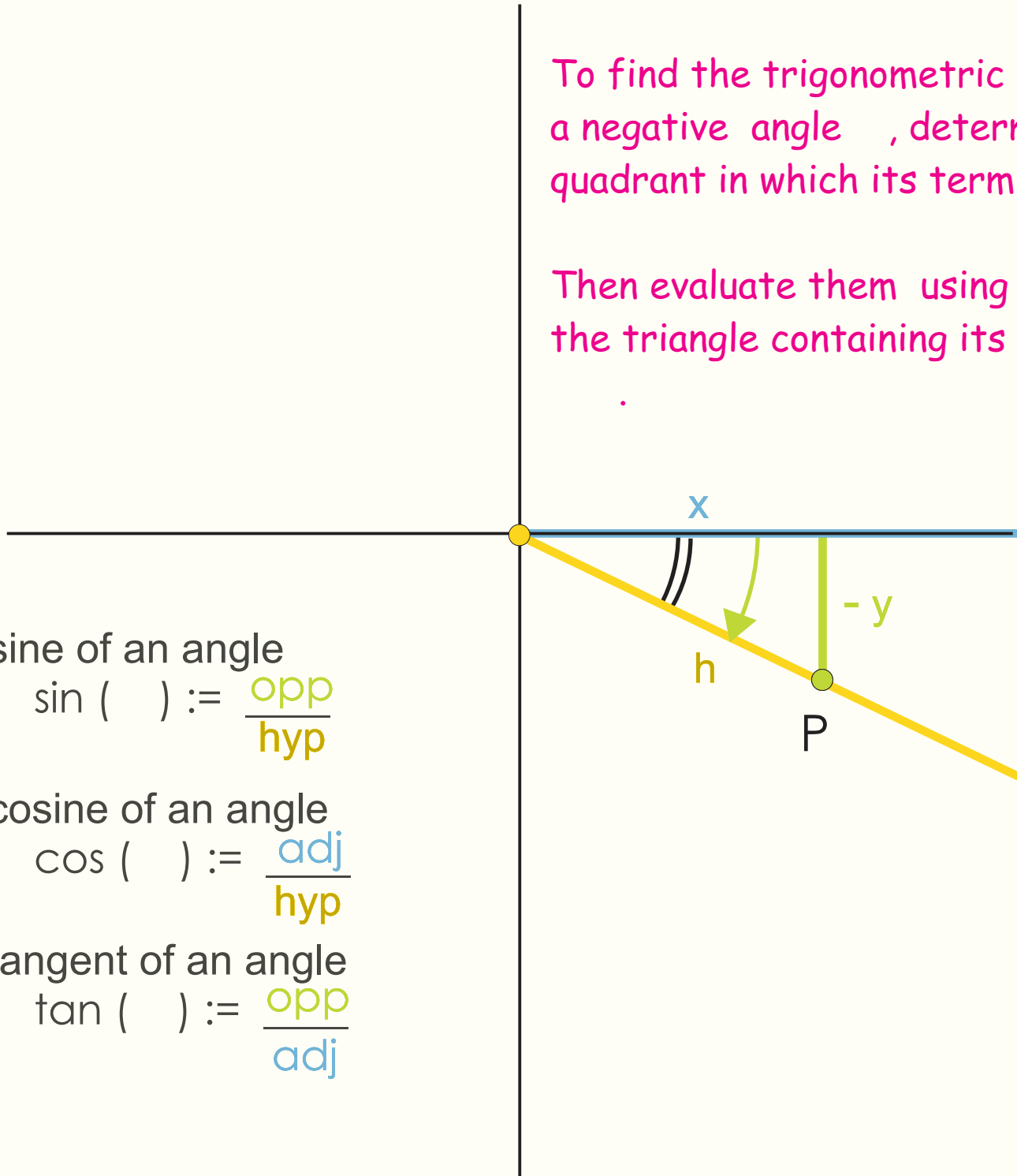
$$\sin (\quad) := \frac{\text{opp}}{\text{hyp}}$$

cosine of an angle

$$\cos (\quad) := \frac{\text{adj}}{\text{hyp}}$$

tangent of an angle

$$\tan (\quad) := \frac{\text{opp}}{\text{adj}}$$



THE TRIGONOMETRIC MEASURE OF NEGATIVE ANGLES

To find the trigonometric measures of a negative angle, determine the quadrant in which its terminal arm lies.

Then evaluate them using the sides of the triangle containing its related angle.

sine of an angle

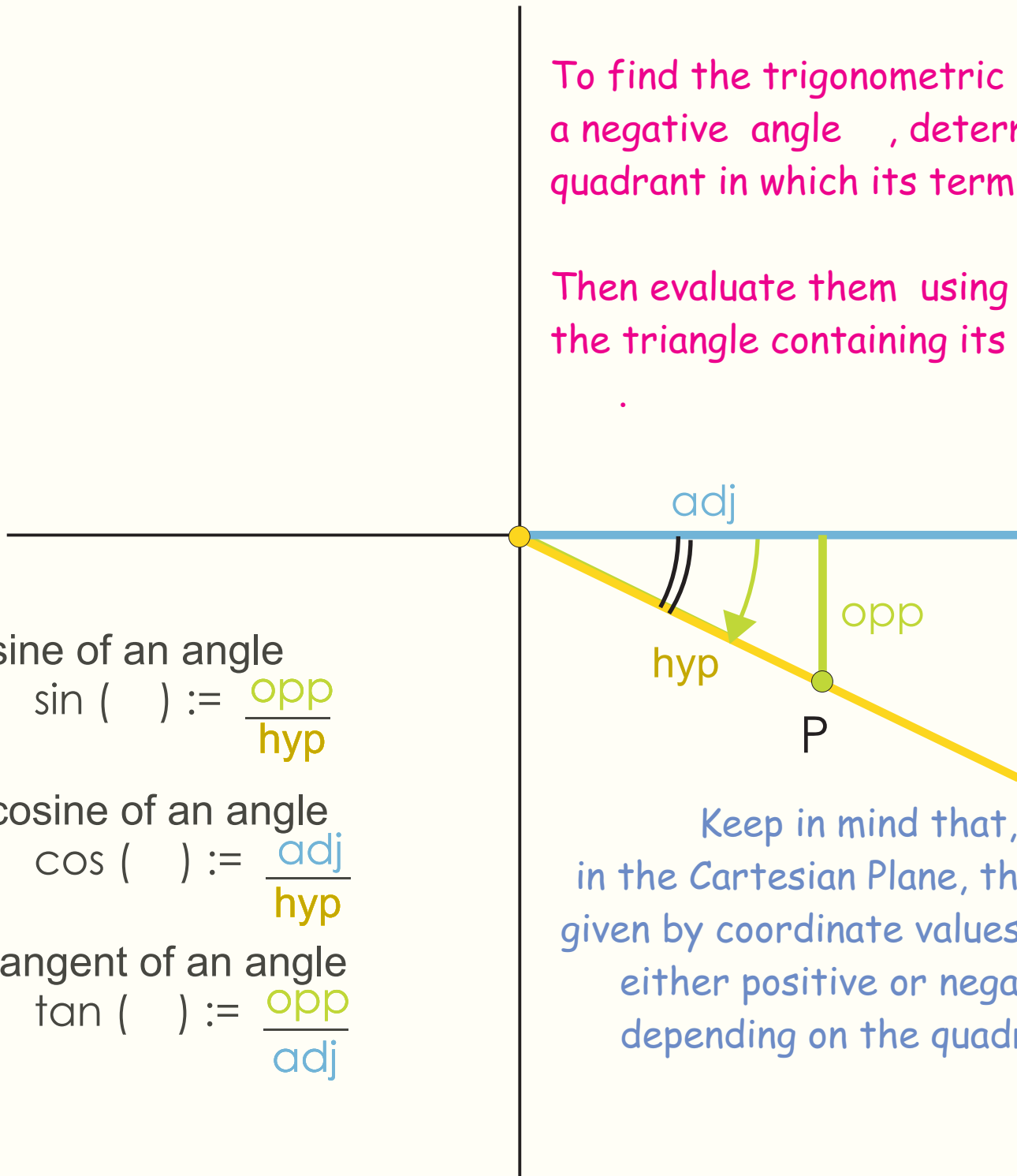
$$\sin (\quad) := \frac{\text{opp}}{\text{hyp}}$$

cosine of an angle

$$\cos (\quad) := \frac{\text{adj}}{\text{hyp}}$$

tangent of an angle

$$\tan (\quad) := \frac{\text{opp}}{\text{adj}}$$



Keep in mind that,
in the Cartesian Plane, the sides
given by coordinate values may be
either positive or negative,
depending on the quadrant.

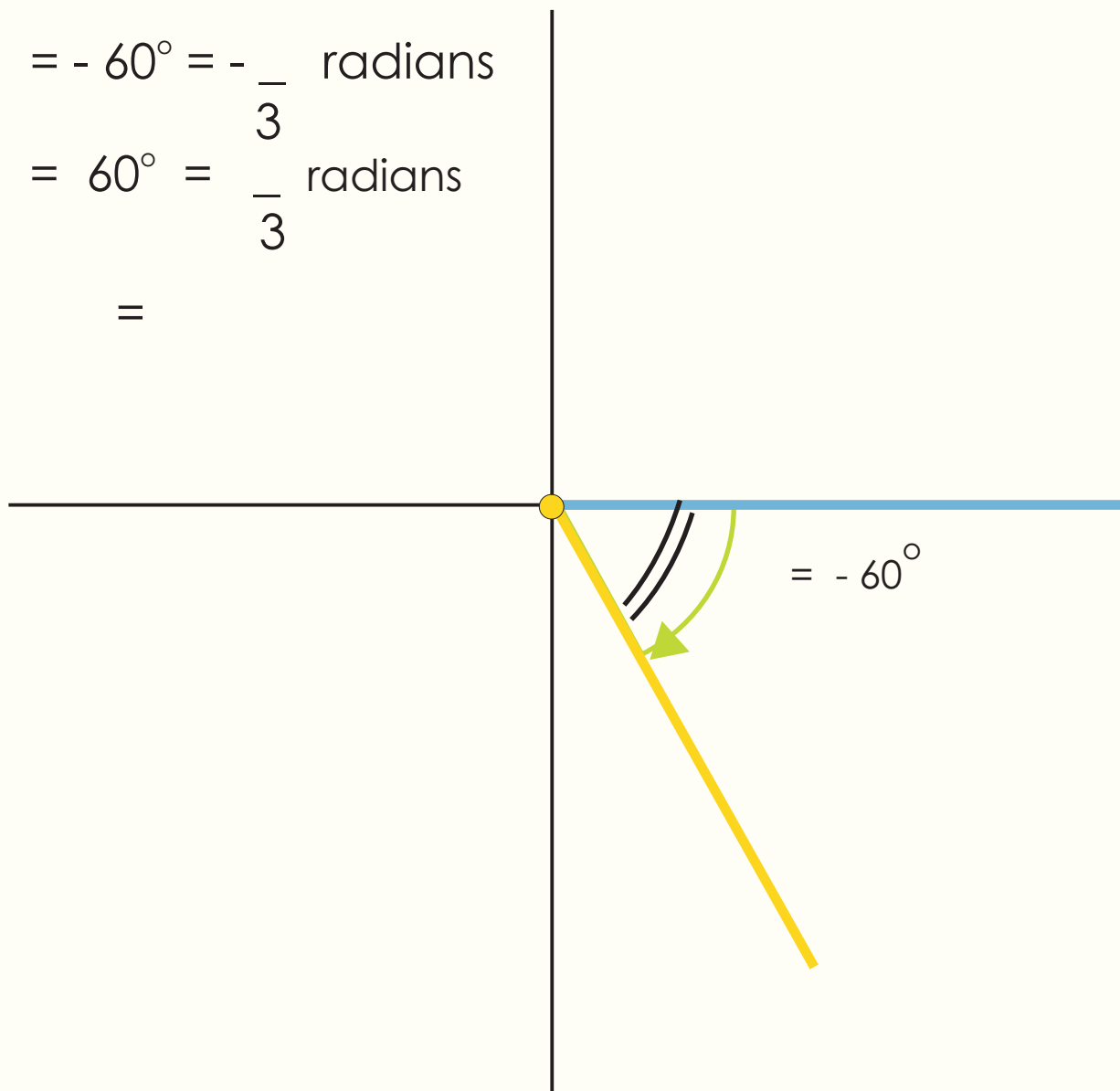
THE TRIGONOMETRY OF ANGLES IN QUADRANT IV

EXAMPLE

$$= -60^\circ = -\frac{\pi}{3} \text{ radians}$$

$$= 60^\circ = \frac{\pi}{3} \text{ radians}$$

=



Find the sine, cosine and tangent values of $-\frac{\pi}{3}$ radians .

THE TRIGONOMETRIC MEASURES OF -60°

THE TRIGONOMETRY OF ANGLES IN QUADRANT IV

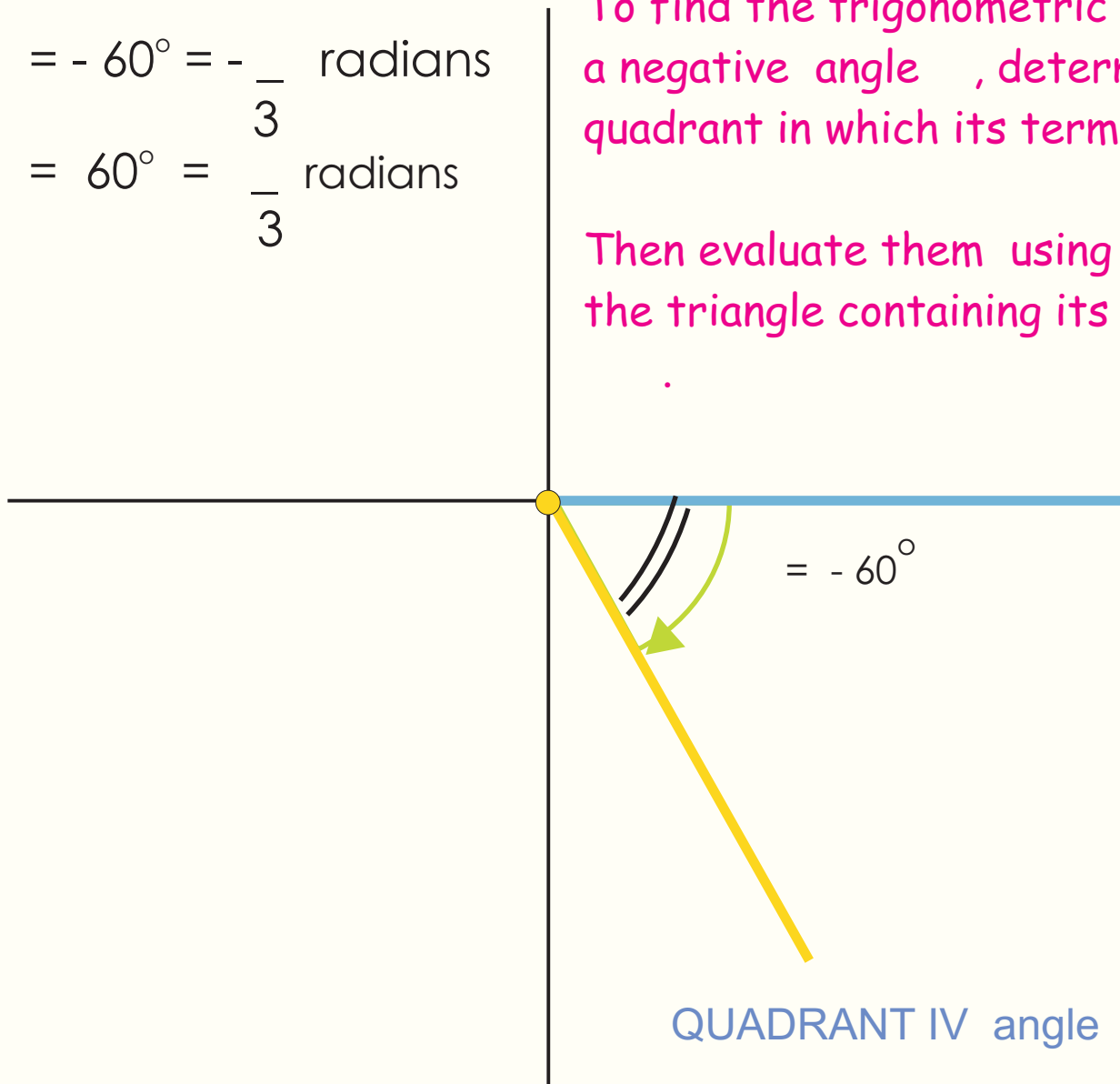
EXAMPLE

$$= -60^\circ = -\frac{\pi}{3} \text{ radians}$$

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To find the trigonometric measures of a negative angle, determine the quadrant in which its terminal arm lies.

Then evaluate them using the sides of the triangle containing its related angle.



Find the sine, cosine and tangent values of $-\frac{\pi}{3}$ radians.

THE TRIGONOMETRIC MEASURES OF -60°

THE TRIGONOMETRY OF ANGLES IN QUADRANT IV

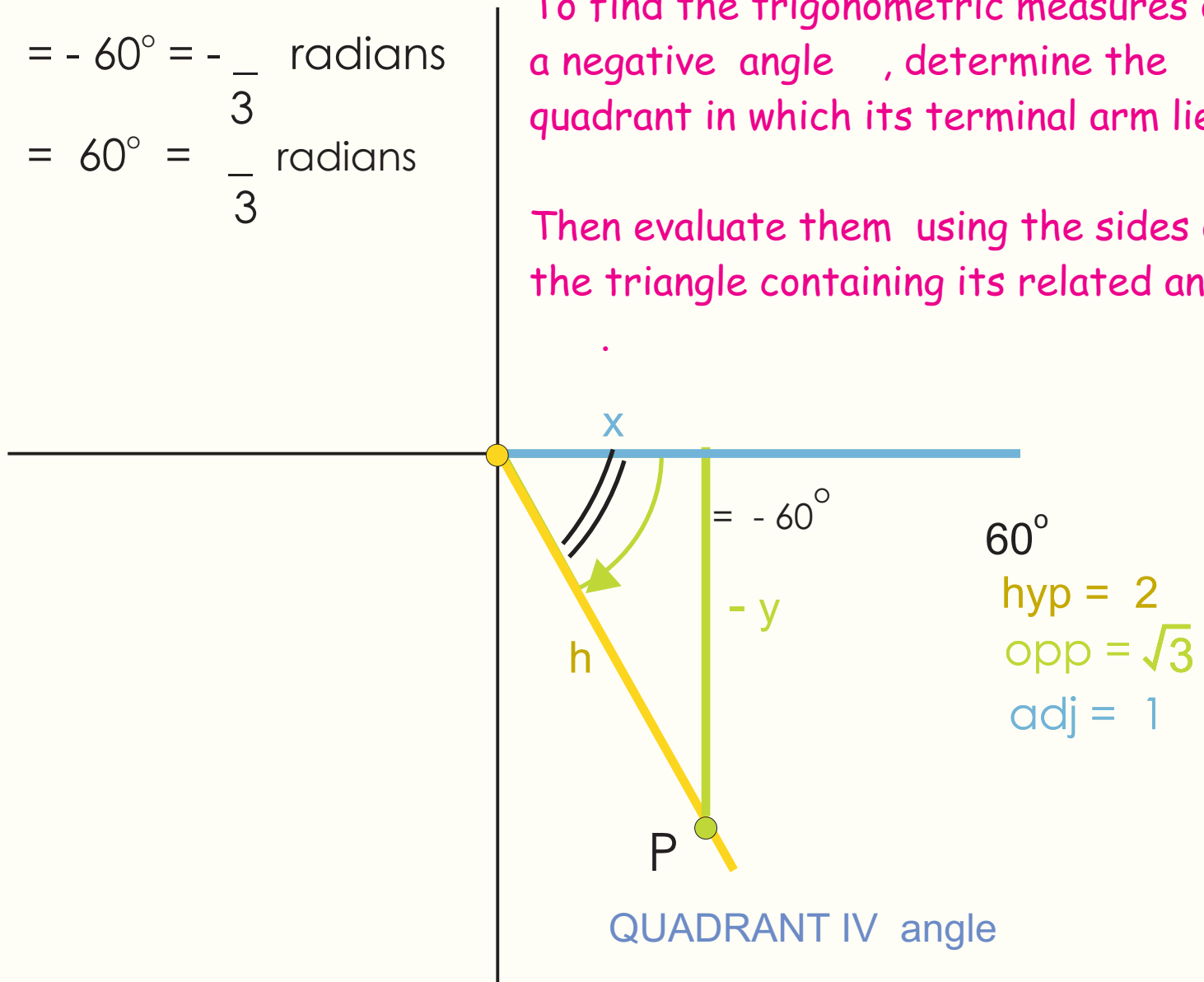
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THE TRIGONOMETRIC MEASURES OF -60°

THE TRIGONOMETRY OF ANGLES IN QUADRANT IV

EXAMPLE

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sine of an angle

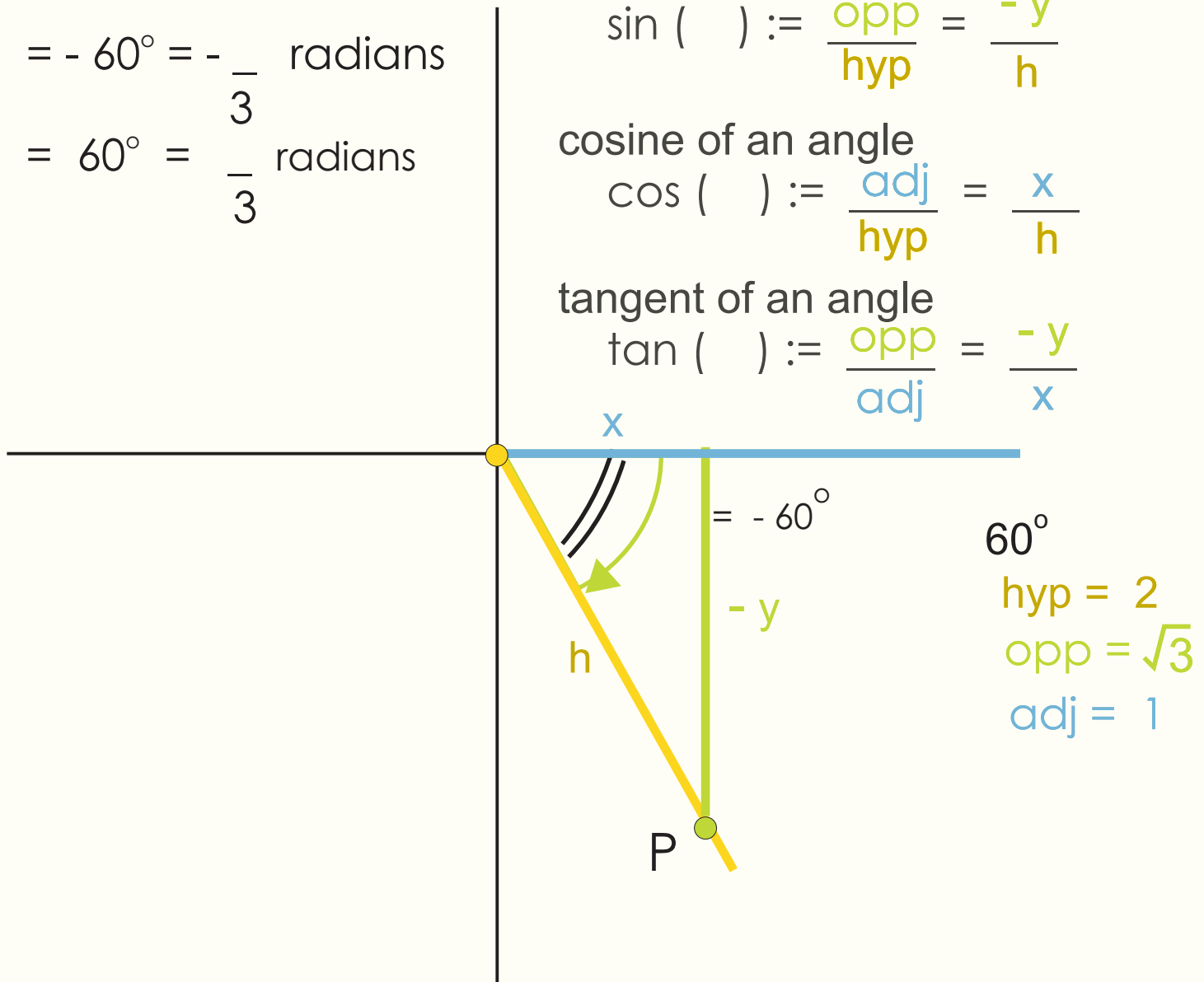
$$\sin (\quad) := \frac{\text{opp}}{\text{hyp}} = \frac{-y}{h}$$

cosine of an angle

$$\cos (\quad) := \frac{\text{adj}}{\text{hyp}} = \frac{x}{h}$$

tangent of an angle

$$\tan (\quad) := \frac{\text{opp}}{\text{adj}} = \frac{-y}{x}$$



Find the sine, cosine and tangent values of $-\frac{\pi}{3}$ radians .

THE TRIGONOMETRIC MEASURES OF -60°

THE TRIGONOMETRY OF ANGLES IN QUADRANT IV

EXAMPLE

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$$= 60^\circ = \frac{\pi}{3} \text{ radians}$$

sine of an angle

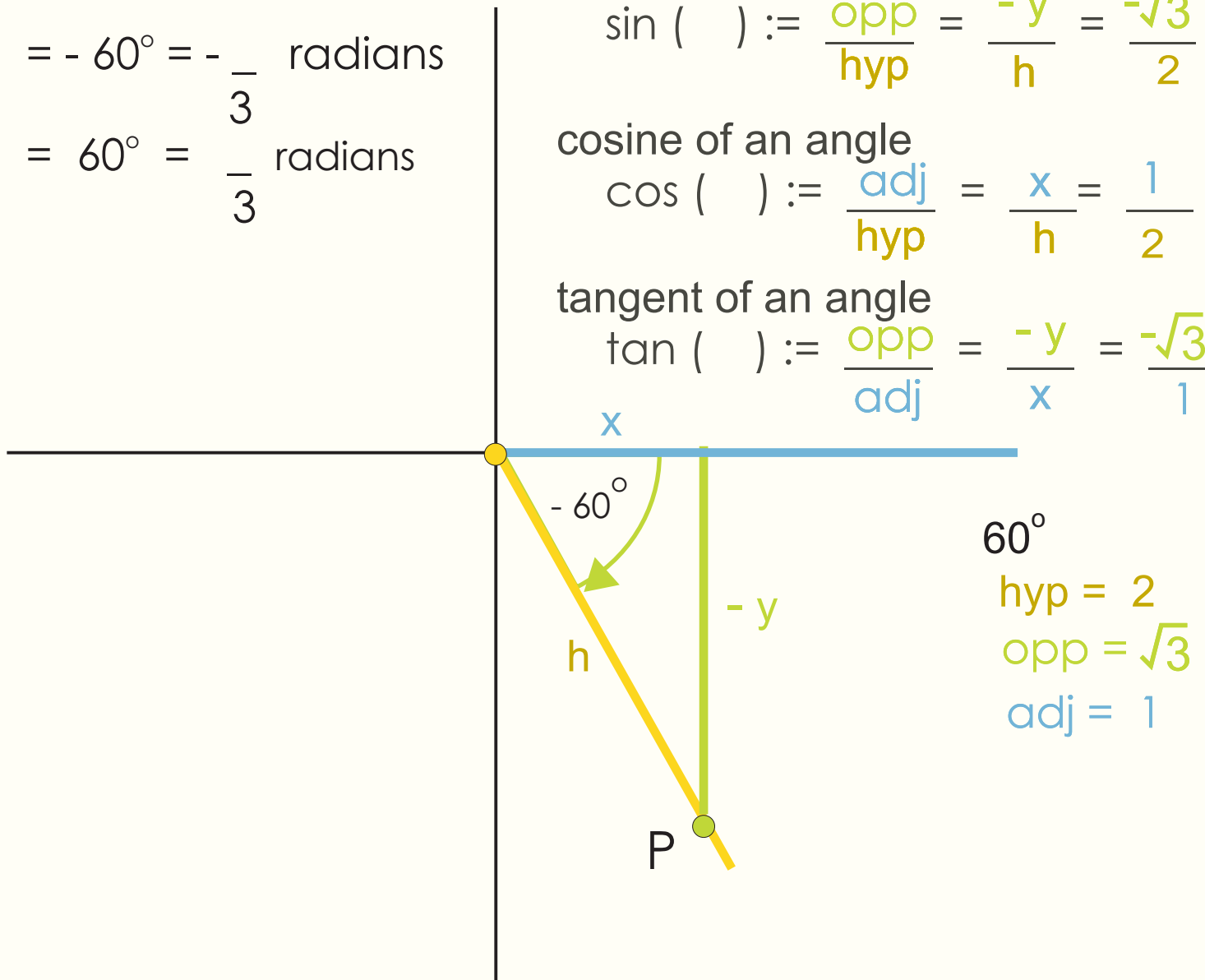
$$\sin () := \frac{\text{opp}}{\text{hyp}} = \frac{-y}{h} = \frac{-\sqrt{3}}{2}$$

cosine of an angle

$$\cos () := \frac{\text{adj}}{\text{hyp}} = \frac{x}{h} = \frac{1}{2}$$

tangent of an angle

$$\tan () := \frac{\text{opp}}{\text{adj}} = \frac{-y}{x} = \frac{-\sqrt{3}}{1}$$

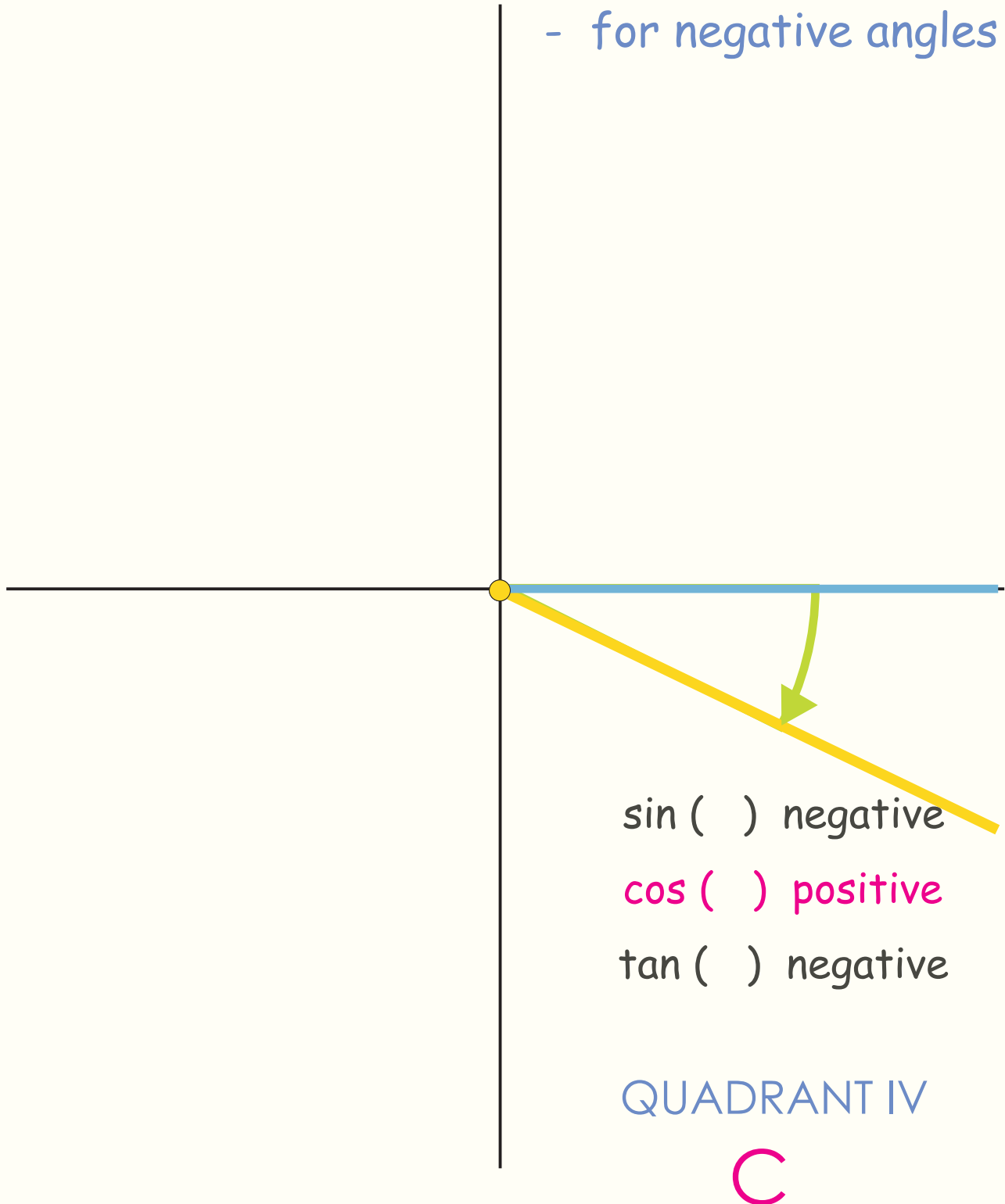


$$\begin{aligned} 60^\circ \\ \text{hyp} &= 2 \\ \text{opp} &= \sqrt{3} \\ \text{adj} &= 1 \end{aligned}$$

Find the sine, cosine and tangent values of $-\frac{\pi}{3}$ radians .

THE TRIGONOMETRIC MEASURES OF -60°

THE **C A S T** FORMULA
- for negative angles



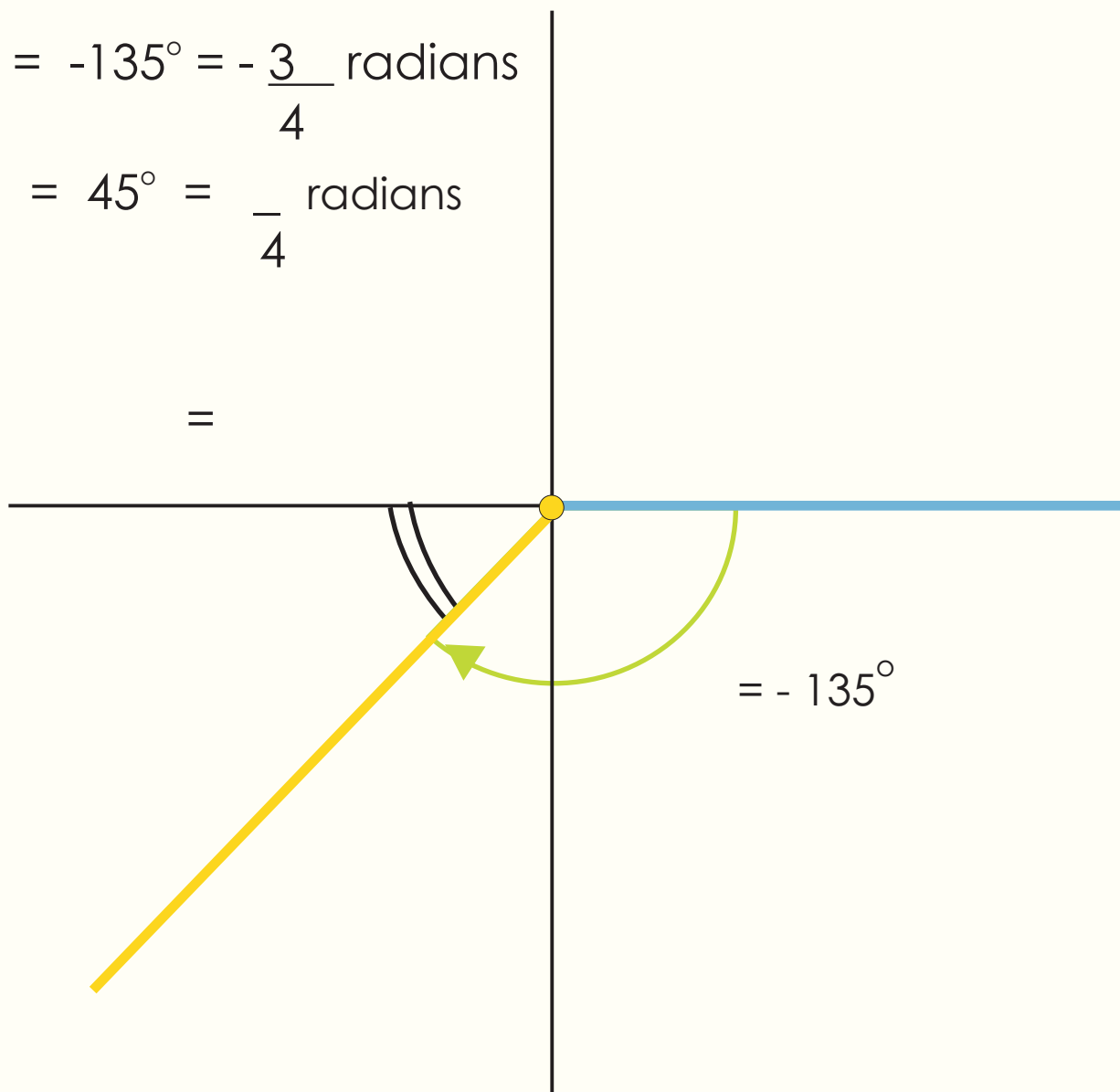
THE TRIGONOMETRY OF ANGLES IN QUADRANT III

EXAMPLE

$$= -135^\circ = -\frac{3}{4} \text{ radians}$$

$$= 45^\circ = \frac{\pi}{4} \text{ radians}$$

=



Find the sine, cosine and tangent values of $-\frac{3}{4}$ radians .

THE TRIGONOMETRIC MEASURES OF -135°

THE TRIGONOMETRY OF ANGLES IN QUADRANT III

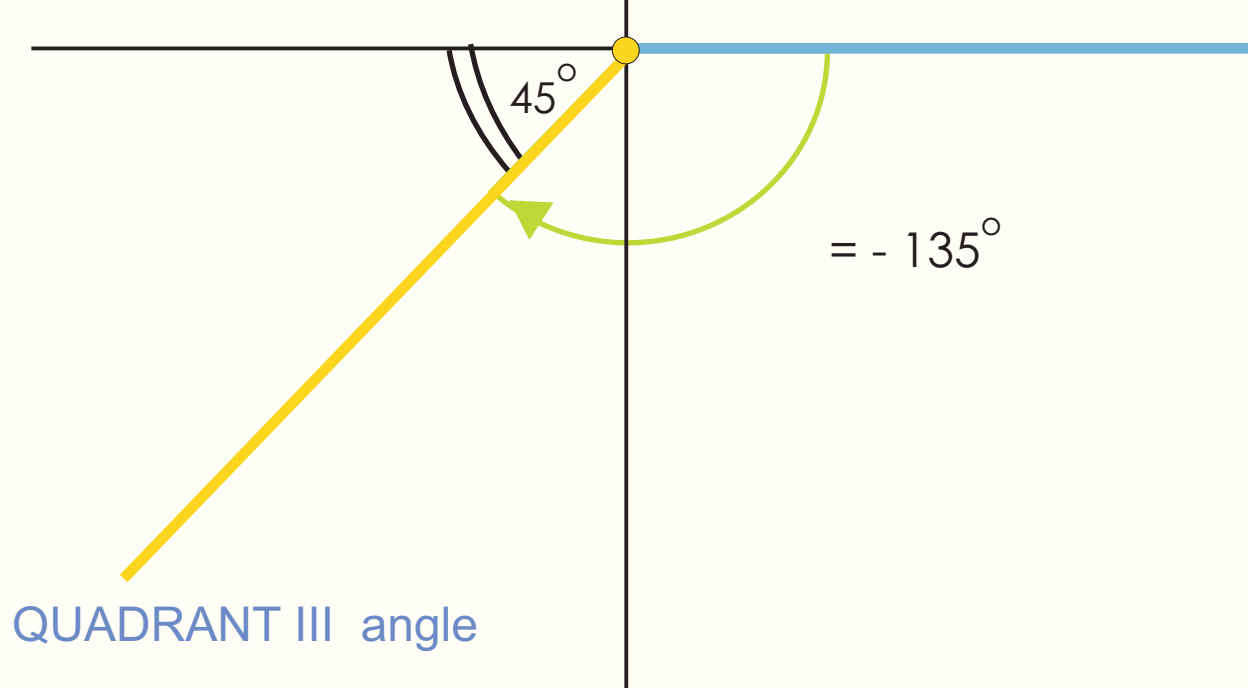
EXAMPLE

$$= -135^\circ = -\frac{3}{4} \text{ radians}$$

$$= 45^\circ = \frac{\pi}{4} \text{ radians}$$

To find the trigonometric measures of a negative angle, determine the quadrant in which its terminal arm lies.

Then evaluate them using the sides of the triangle containing its related angle.



Find the sine, cosine and tangent values of $-\frac{3}{4}$ radians.

THE TRIGONOMETRIC MEASURES OF -135°

THE TRIGONOMETRY OF ANGLES IN QUADRANT III

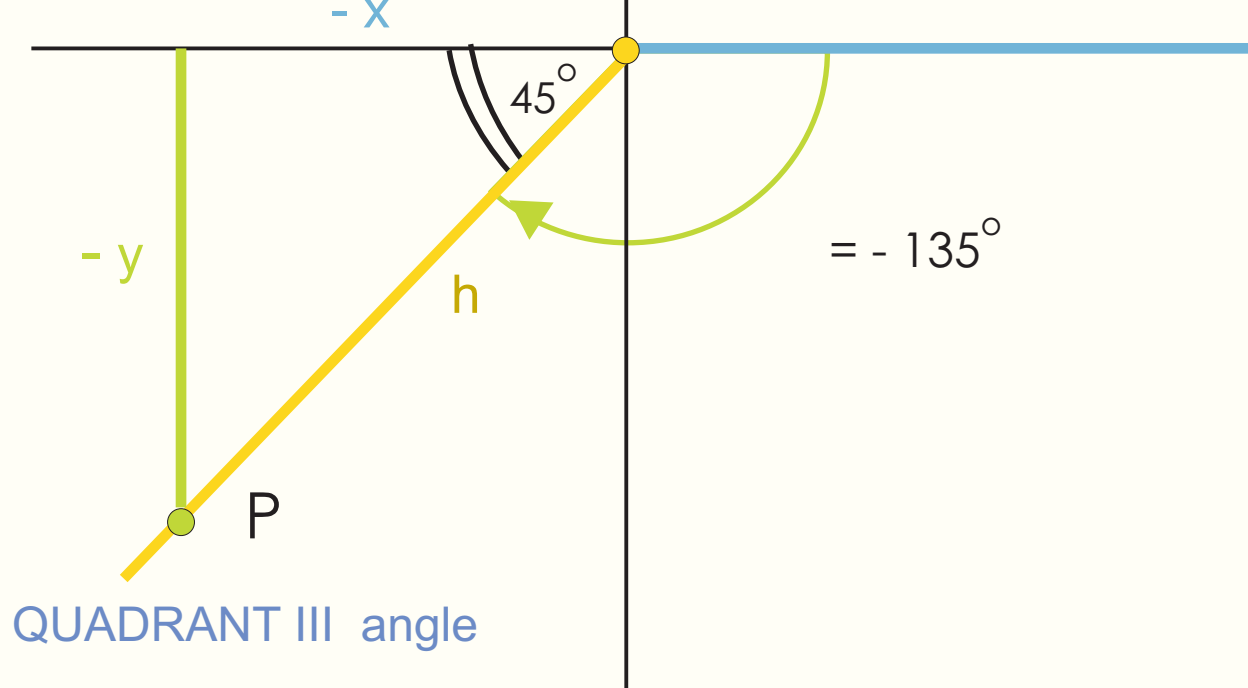
EXAMPLE

$$= -135^\circ = -\frac{3}{4} \text{ radians}$$

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To find the trigonometric measures of a negative angle, determine the quadrant in which its terminal arm lies.

Then evaluate them using the sides of the triangle containing its related angle.



Find the sine, cosine and tangent values of $-\frac{3}{4}$ radians.

THE TRIGONOMETRIC MEASURES OF -135°

THE TRIGONOMETRY OF ANGLES IN QUADRANT III

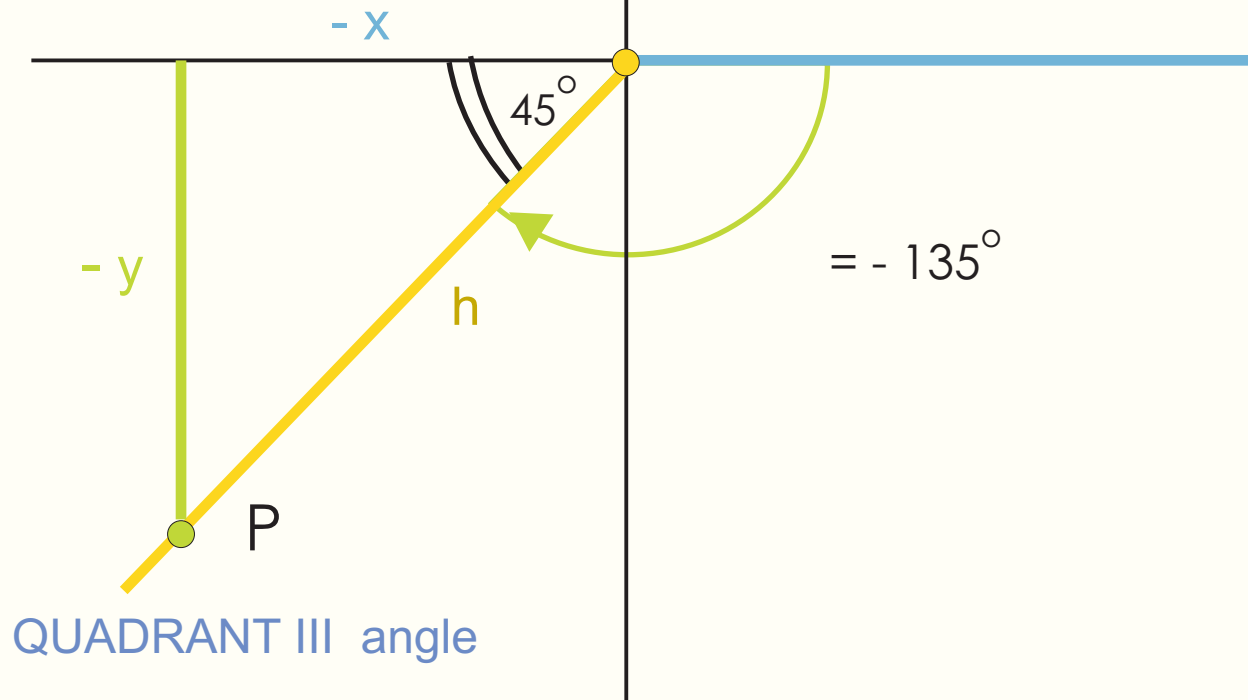
EXAMPLE

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$$= 45^\circ = \frac{\pi}{4} \text{ radians}$$

To find the trigonometric measures of a negative angle, determine the quadrant in which its terminal arm lies.

Then evaluate them using the sides of the triangle containing its related angle.



$$\begin{aligned} 45^\circ \\ \text{hyp} &= \sqrt{2} \\ \text{opp} &= 1 \\ \text{adj} &= 1 \end{aligned}$$

Find the sine, cosine and tangent values of $-\frac{3}{4}$ radians.

THE TRIGONOMETRIC MEASURES OF -135°

THE TRIGONOMETRY OF ANGLES IN QUADRANT III

EXAMPLE

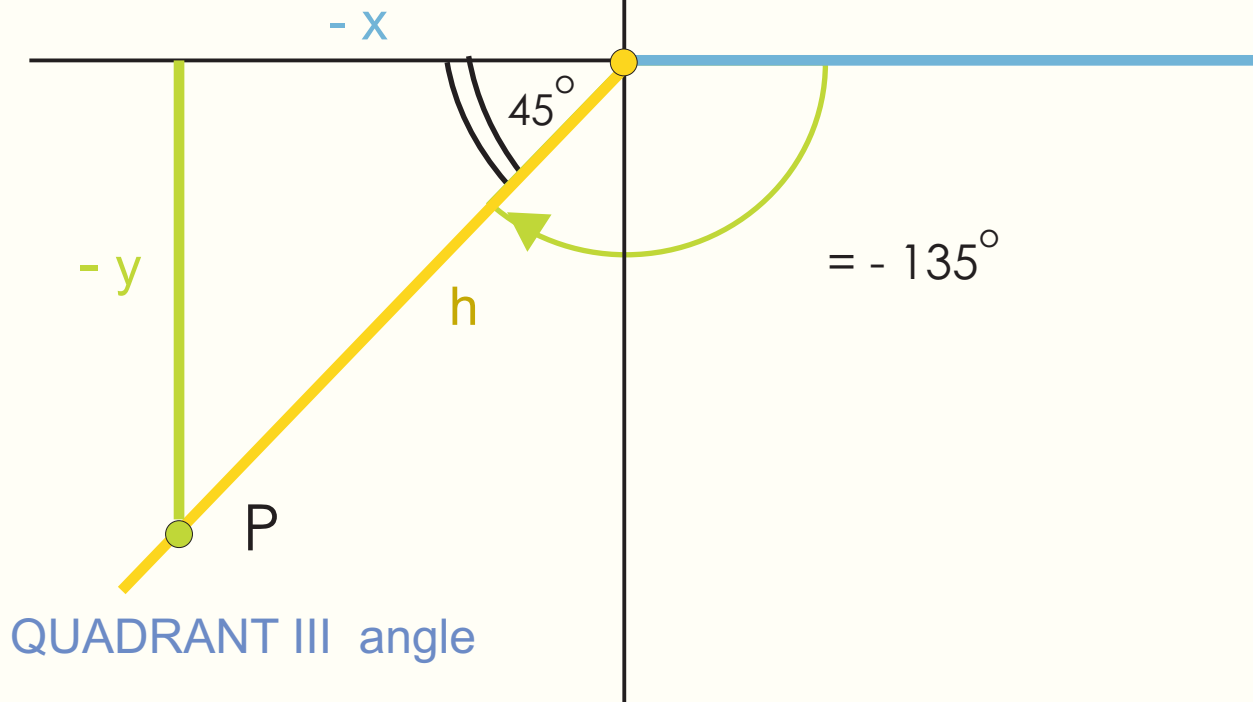
$$= -135^\circ = -\frac{3}{4} \text{ radians}$$

$$= 45^\circ = \frac{\pi}{4} \text{ radians}$$

$$\sin(-135^\circ) := \frac{\text{opp}}{\text{hyp}} = \frac{-y}{h}$$

$$\cos(-135^\circ) := \frac{\text{adj}}{\text{hyp}} = \frac{-x}{h}$$

$$\tan(-135^\circ) := \frac{\text{opp}}{\text{adj}} = \frac{-y}{-x}$$



$$\begin{aligned} 45^\circ \\ \text{hyp} &= \sqrt{2} \\ \text{opp} &= 1 \\ \text{adj} &= 1 \end{aligned}$$

Find the sine, cosine and tangent values of $-\frac{3}{4}$ radians .

THE TRIGONOMETRIC MEASURES OF -135°

THE TRIGONOMETRY OF ANGLES IN QUADRANT III

EXAMPLE

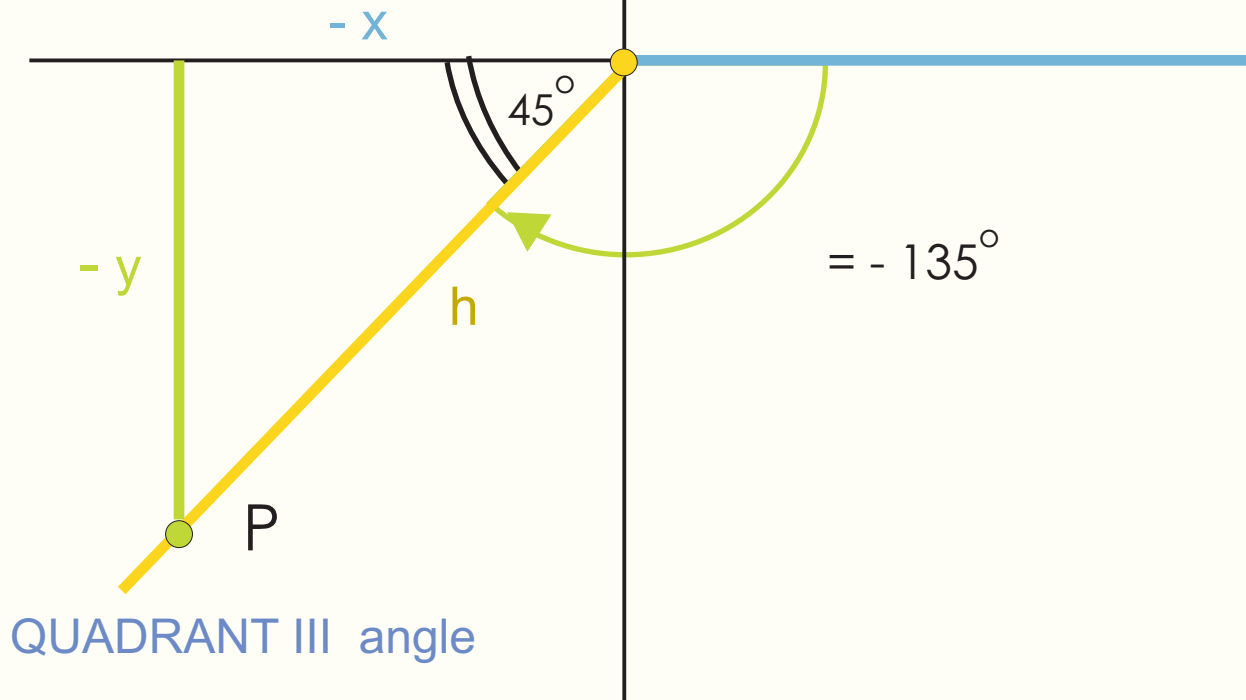
$$= -135^\circ = -\frac{3}{4} \text{ radians}$$

$$= 45^\circ = \frac{\pi}{4} \text{ radians}$$

$$\sin(-135^\circ) := \frac{\text{opp}}{\text{hyp}} = \frac{-y}{h} = \frac{-1}{\sqrt{2}}$$

$$\cos(-135^\circ) := \frac{\text{adj}}{\text{hyp}} = \frac{-x}{h} = \frac{-1}{\sqrt{2}}$$

$$\tan(-135^\circ) := \frac{\text{opp}}{\text{adj}} = \frac{-y}{-x} = \frac{-1}{-1}$$



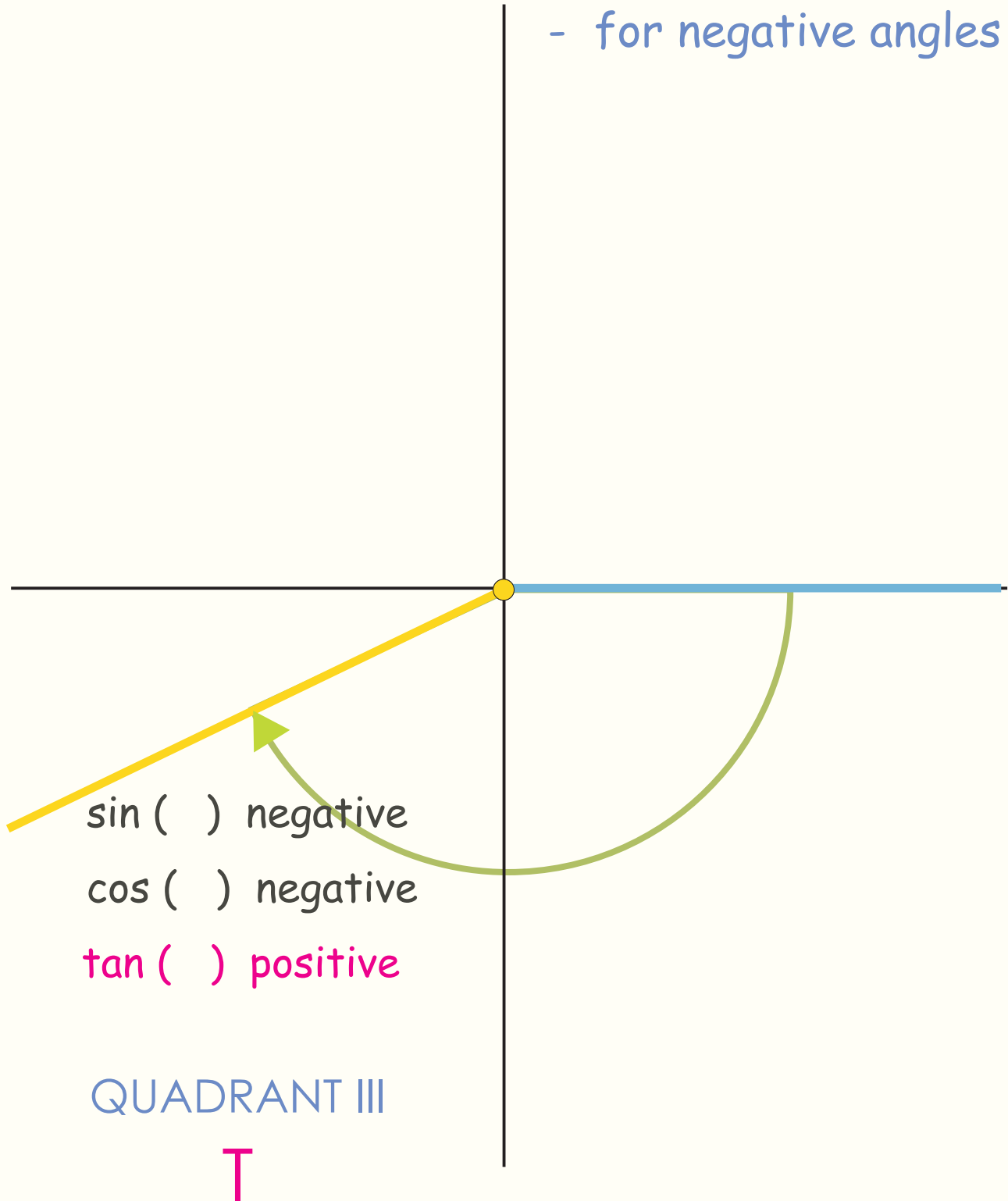
$$\begin{aligned} 45^\circ \\ \text{hyp} &= \sqrt{2} \\ \text{opp} &= 1 \\ \text{adj} &= 1 \end{aligned}$$

Find the sine, cosine and tangent values of $-\frac{3}{4}$ radians .

THE TRIGONOMETRIC MEASURES OF -135°

THE CAST FORMULA

- for negative angles

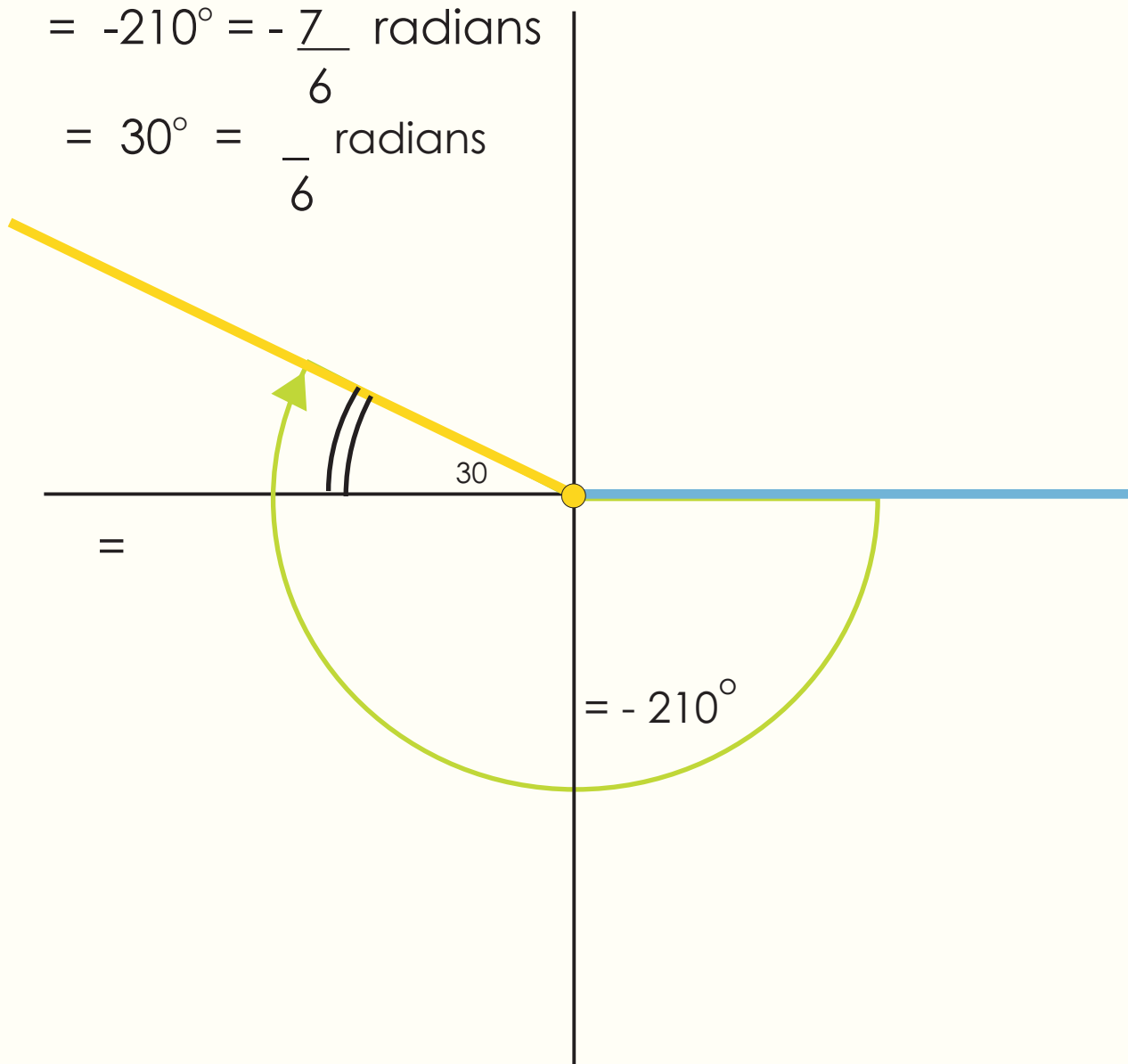


THE TRIGONOMETRY OF ANGLES IN QUADRANT II

EXAMPLE

$$= -210^\circ = -\frac{7}{6} \text{ radians}$$

$$= 30^\circ = \frac{\pi}{6} \text{ radians}$$



Find the sine, cosine and tangent values of $-\frac{7}{6}$ radians .

THE TRIGONOMETRIC MEASURES OF -210°

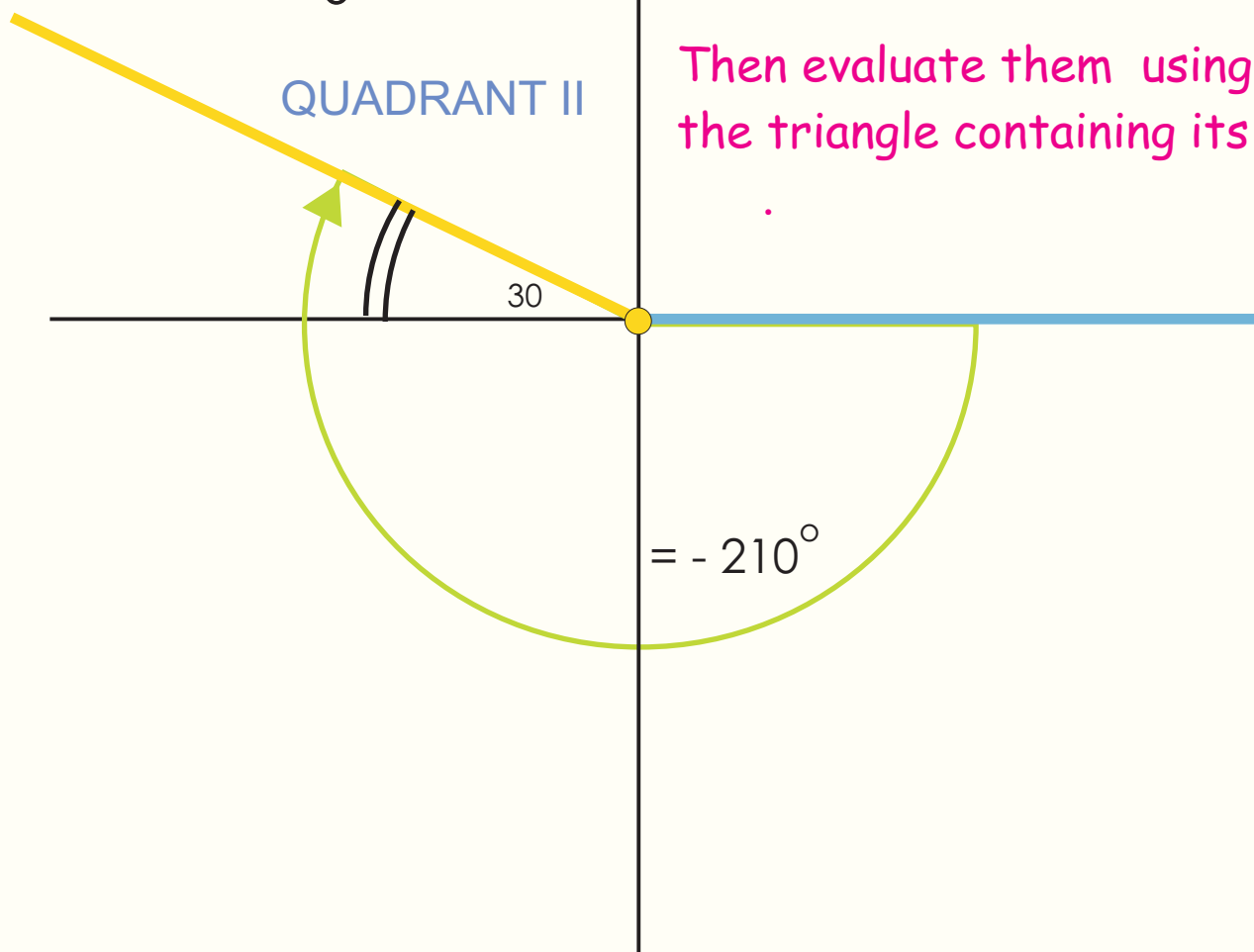
THE TRIGONOMETRY OF ANGLES IN QUADRANT II

EXAMPLE

$$\begin{aligned} &= -210^\circ = -\frac{7}{6} \text{ radians} \\ &= 30^\circ = \frac{\pi}{6} \text{ radians} \end{aligned}$$

To find the trigonometric measures of a negative angle, determine the quadrant in which its terminal arm lies.

Then evaluate them using the sides of the triangle containing its related angle.



Find the sine, cosine and tangent values of $-\frac{7}{6}$ radians.

THE TRIGONOMETRIC MEASURES OF -210°

THE TRIGONOMETRY OF ANGLES IN QUADRANT II

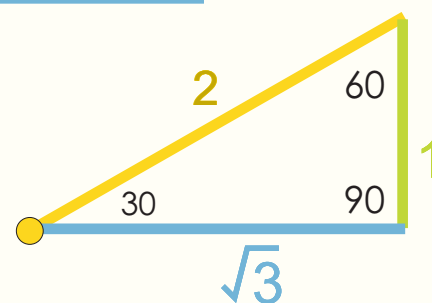
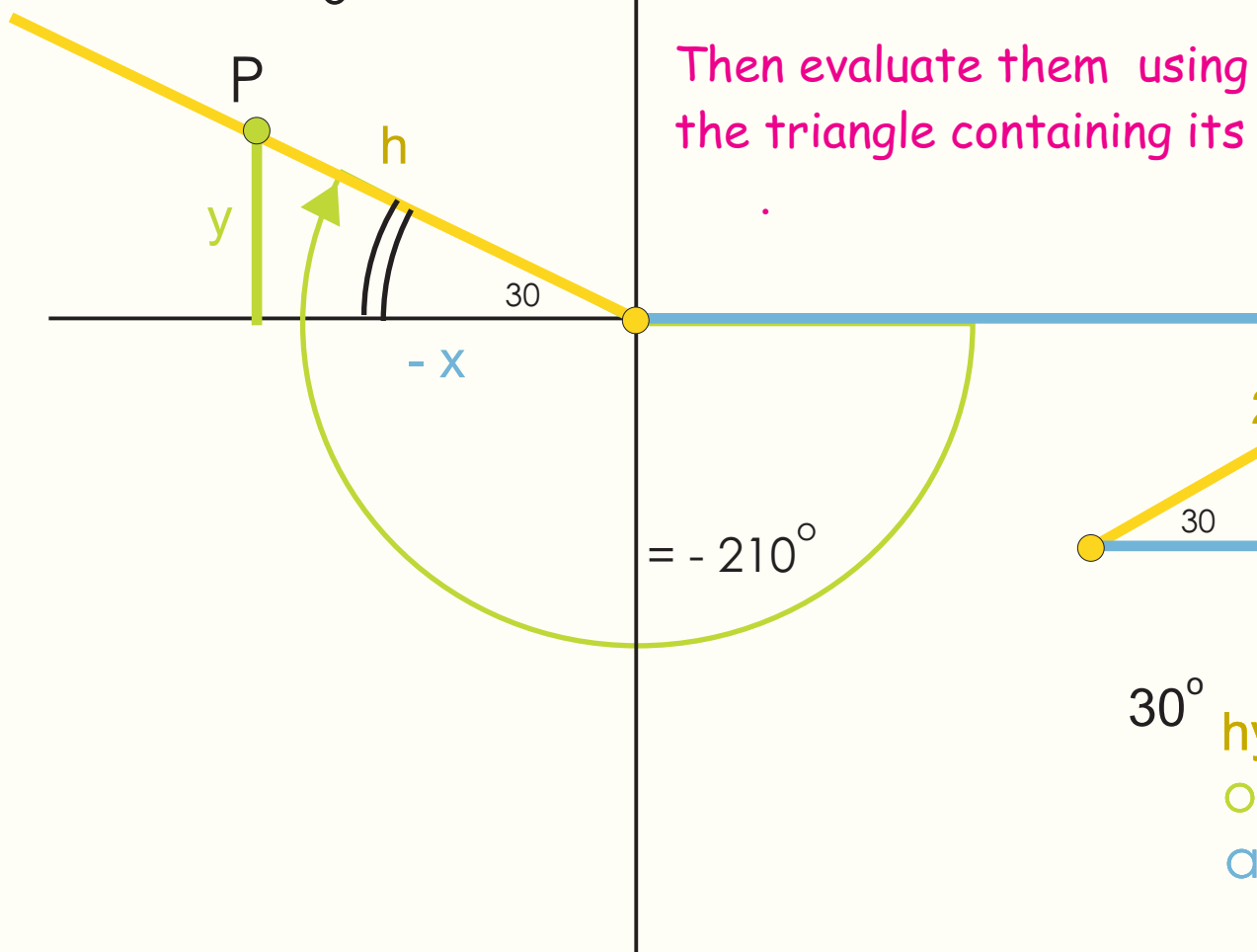
EXAMPLE

$$= -210^\circ = -\frac{7}{6} \text{ radians}$$

$$= 30^\circ = \frac{\pi}{6} \text{ radians}$$

To find the trigonometric measures of a negative angle, determine the quadrant in which its terminal arm lies.

Then evaluate them using the sides of the triangle containing its related angle.



$$30^\circ \begin{cases} \text{hyp} = 2 \\ \text{opp} = 1 \\ \text{adj} = \sqrt{3} \end{cases}$$

Find the sine, cosine and tangent values of $-\frac{7}{6}$ radians.

THE TRIGONOMETRIC MEASURES OF -210°

THE TRIGONOMETRY OF ANGLES IN QUADRANT II

EXAMPLE

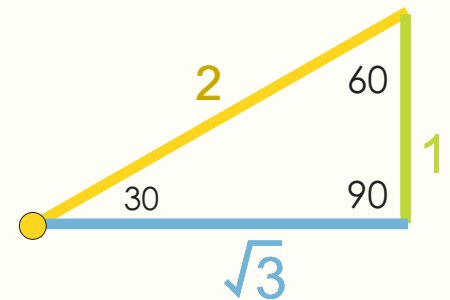
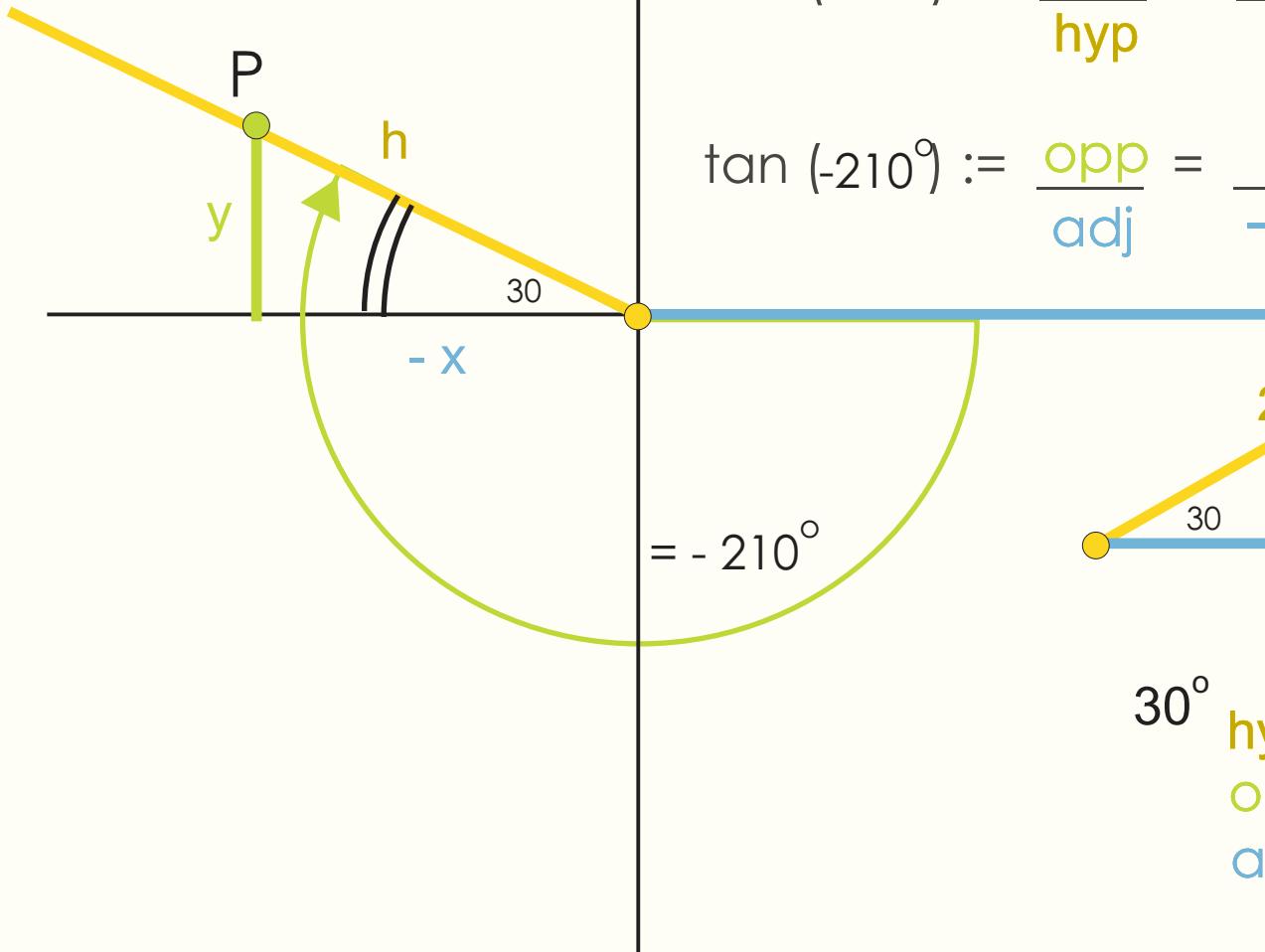
$$= -210^\circ = -\frac{7}{6} \text{ radians}$$

$$= 30^\circ = \frac{\pi}{6} \text{ radians}$$

$$\sin(-210^\circ) := \frac{\text{opp}}{\text{hyp}} = \frac{y}{h}$$

$$\cos(-210^\circ) := \frac{\text{adj}}{\text{hyp}} = \frac{-x}{h}$$

$$\tan(-210^\circ) := \frac{\text{opp}}{\text{adj}} = \frac{y}{-x}$$



$$30^\circ \begin{cases} \text{hyp} = 2 \\ \text{opp} = 1 \\ \text{adj} = \sqrt{3} \end{cases}$$

Find the sine, cosine and tangent values of $-\frac{7}{6}$ radians.

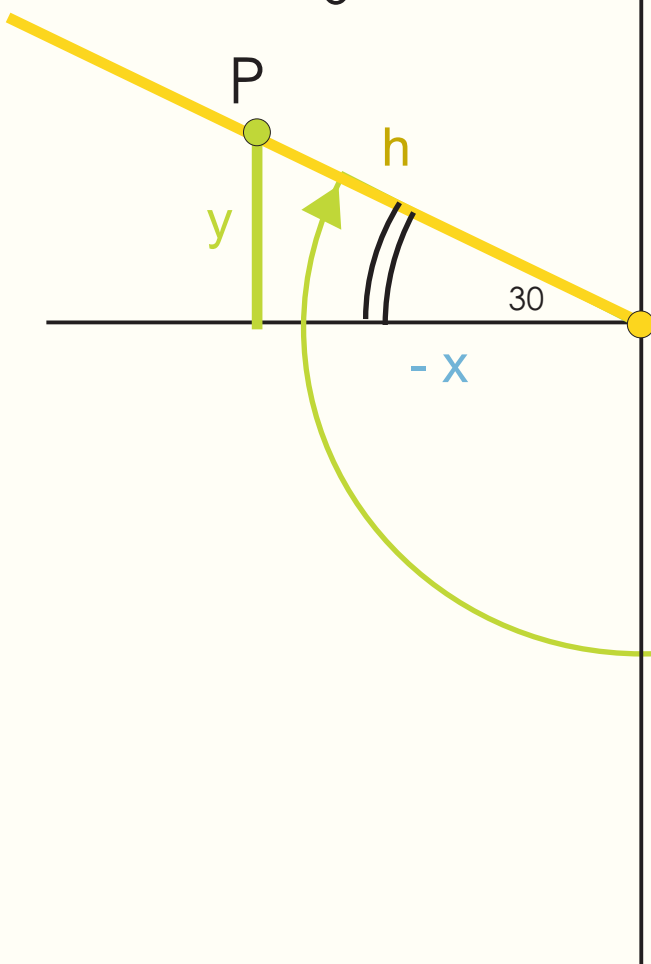
THE TRIGONOMETRIC MEASURES OF -210°

THE TRIGONOMETRY OF ANGLES IN QUADRANT II

EXAMPLE

$$= -210^\circ = -\frac{7}{6} \text{ radians}$$

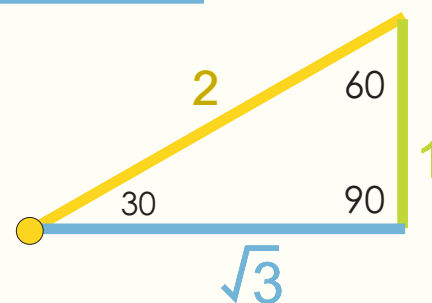
$$= 30^\circ = \frac{\pi}{6} \text{ radians}$$



$$\sin (-210^\circ) := \frac{\text{opp}}{\text{hyp}} = \frac{y}{h} = \frac{1}{2}$$

$$\cos (-210^\circ) := \frac{\text{adj}}{\text{hyp}} = \frac{-x}{h} = \frac{-\sqrt{3}}{2}$$

$$\tan (-210^\circ) := \frac{\text{opp}}{\text{adj}} = \frac{y}{-x} = \frac{1}{-\sqrt{3}}$$



$$\begin{aligned} 30^\circ \quad & \text{hyp} = 2 \\ & \text{opp} = 1 \\ & \text{adj} = \sqrt{3} \end{aligned}$$

Find the sine, cosine and tangent values of $-\frac{7}{6}$ radians .

THE TRIGONOMETRIC MEASURES OF -210°

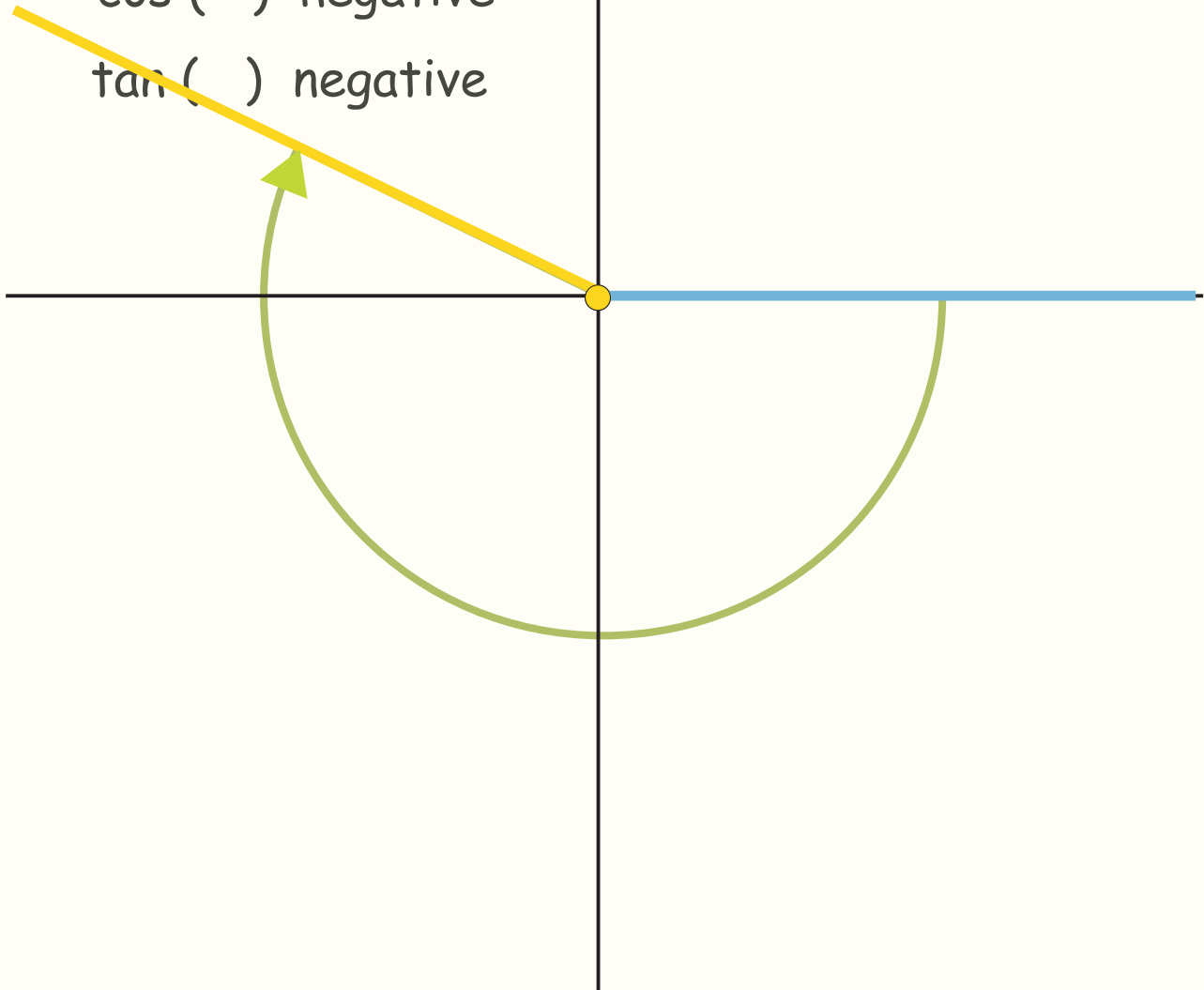
THE **C A S T** FORMULA
S - for negative angles

QUADRANT II

sin () positive

cos () negative

tan () negative

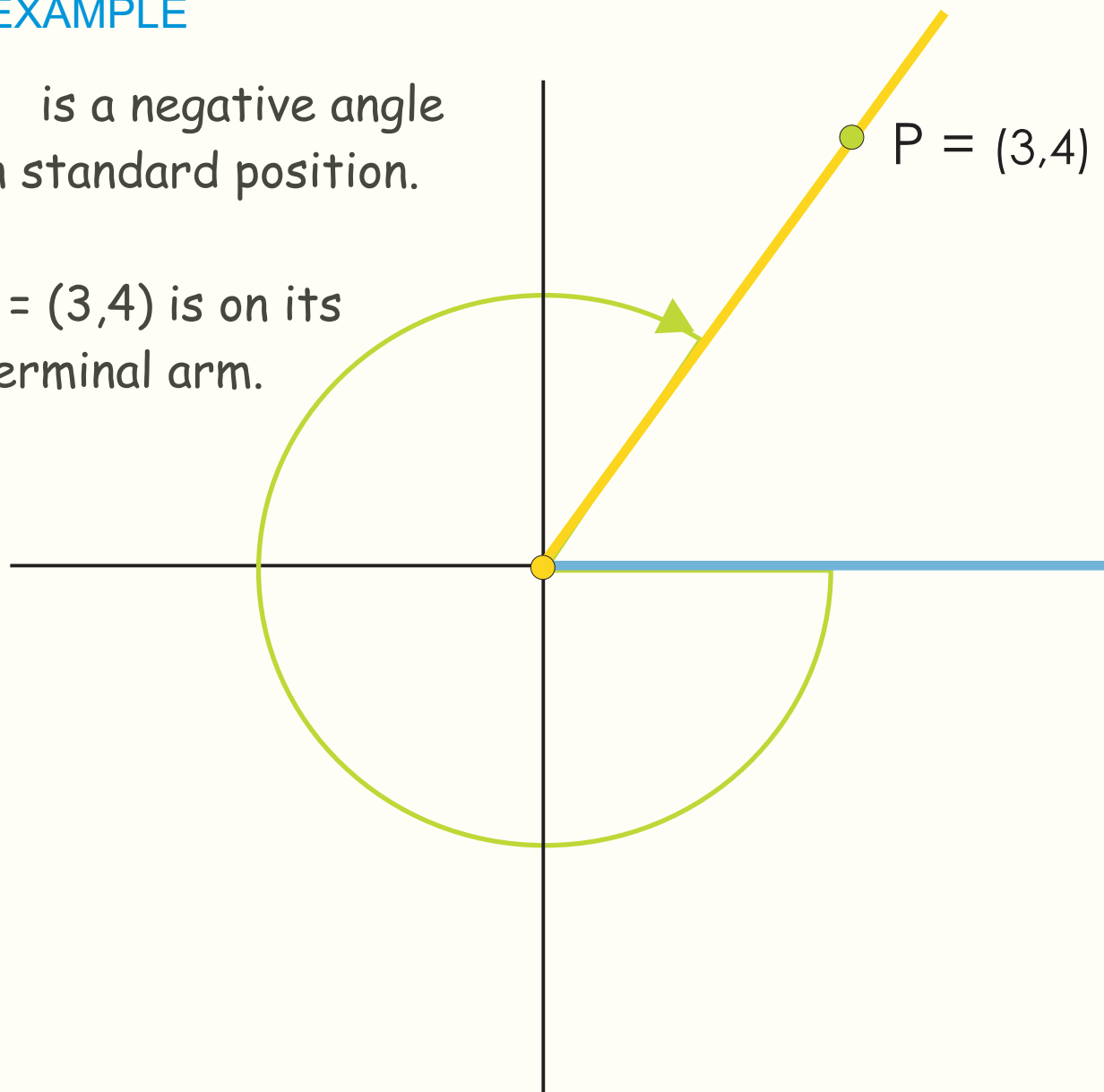


THE TRIGONOMETRY OF ANGLES IN QUADRANT I

EXAMPLE

is a negative angle
in standard position.

$P = (3,4)$ is on its
terminal arm.



Find the sine, cosine and tangent values of the angle .

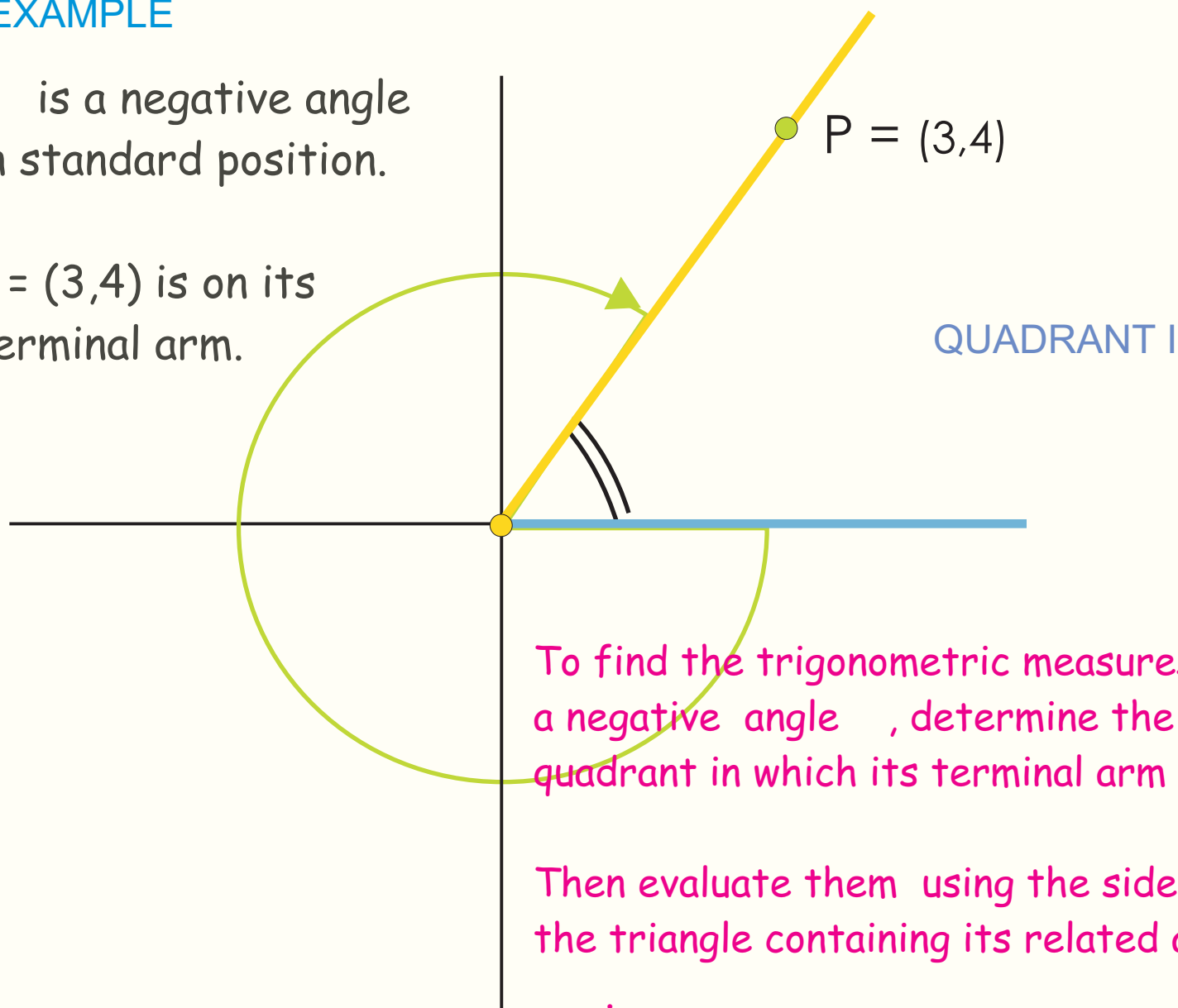
THE TRIGONOMETRIC MEASURES OF NEGATIVE ANGLES

THE TRIGONOMETRY OF ANGLES IN QUADRANT I

EXAMPLE

is a negative angle
in standard position.

$P = (3,4)$ is on its
terminal arm.



Find the sine, cosine and tangent values of the angle .

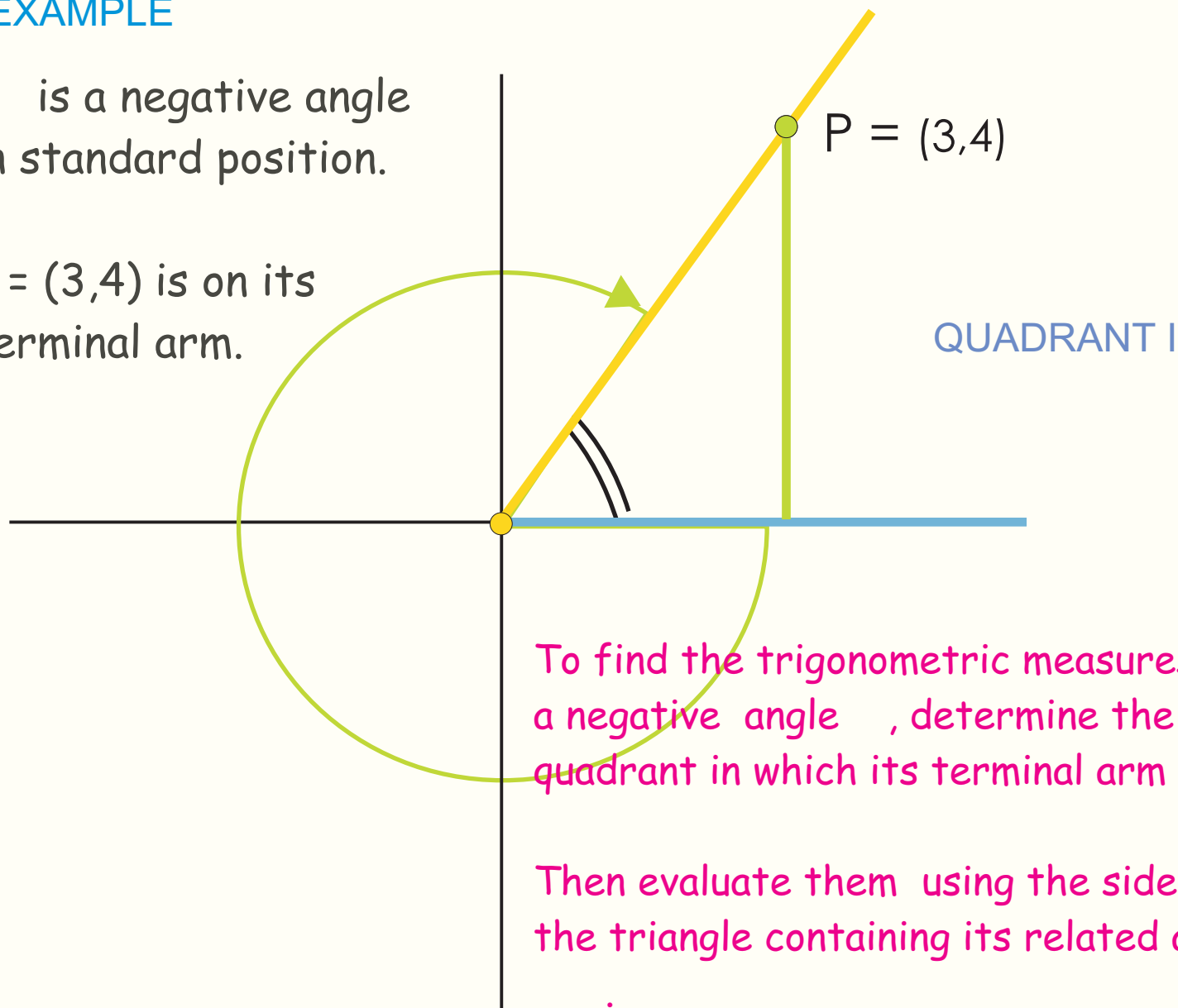
THE TRIGONOMETRIC MEASURES OF NEGATIVE ANGLES

THE TRIGONOMETRY OF ANGLES IN QUADRANT I

EXAMPLE

is a negative angle
in standard position.

$P = (3,4)$ is on its
terminal arm.



Find the sine, cosine and tangent values of the angle .

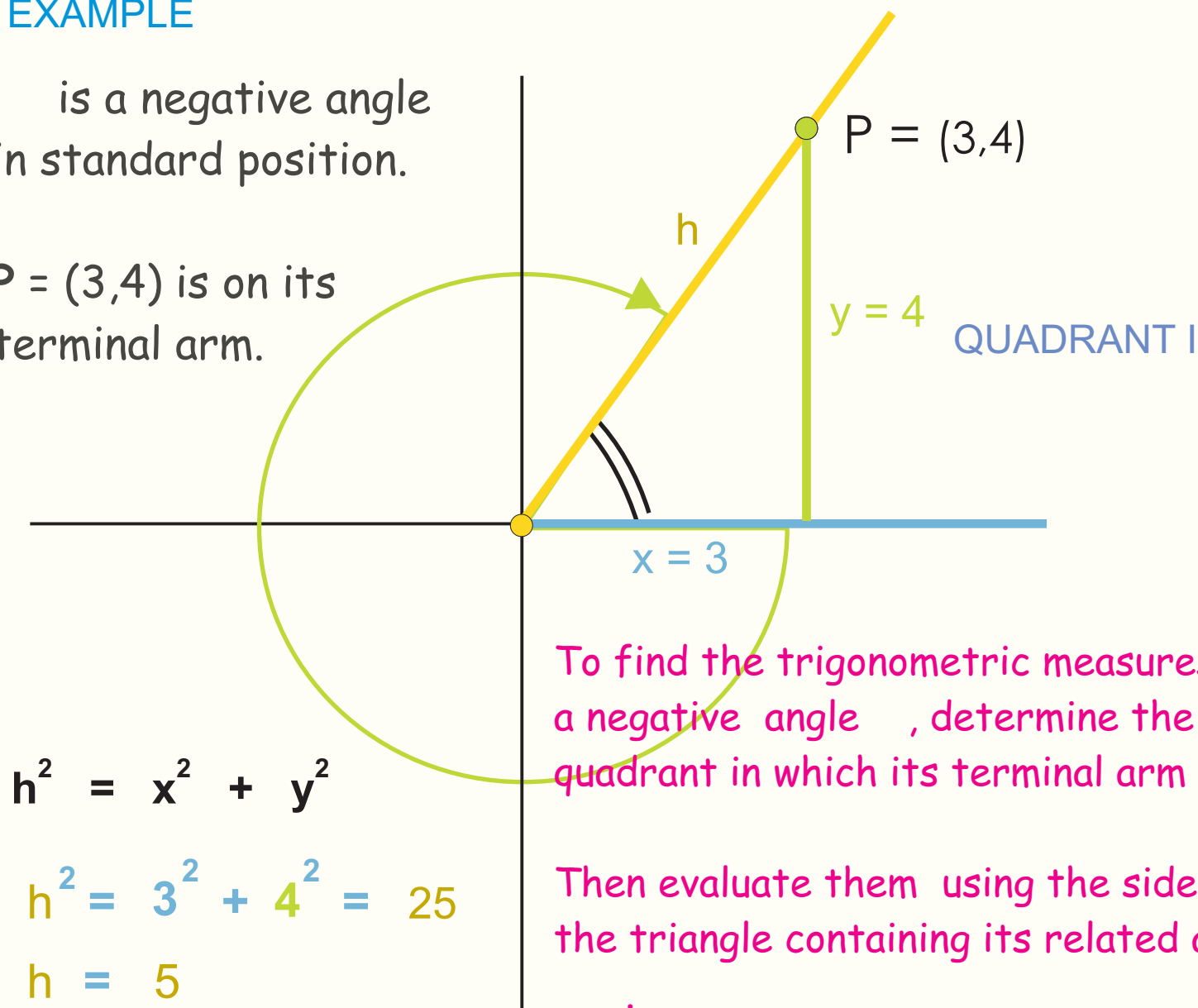
THE TRIGONOMETRIC MEASURES OF NEGATIVE ANGLES

THE TRIGONOMETRY OF ANGLES IN QUADRANT I

EXAMPLE

is a negative angle
in standard position.

$P = (3,4)$ is on its
terminal arm.



$$h^2 = x^2 + y^2$$

$$h^2 = 3^2 + 4^2 = 25$$

$$h = 5$$

Find the sine, cosine and tangent values of the angle .

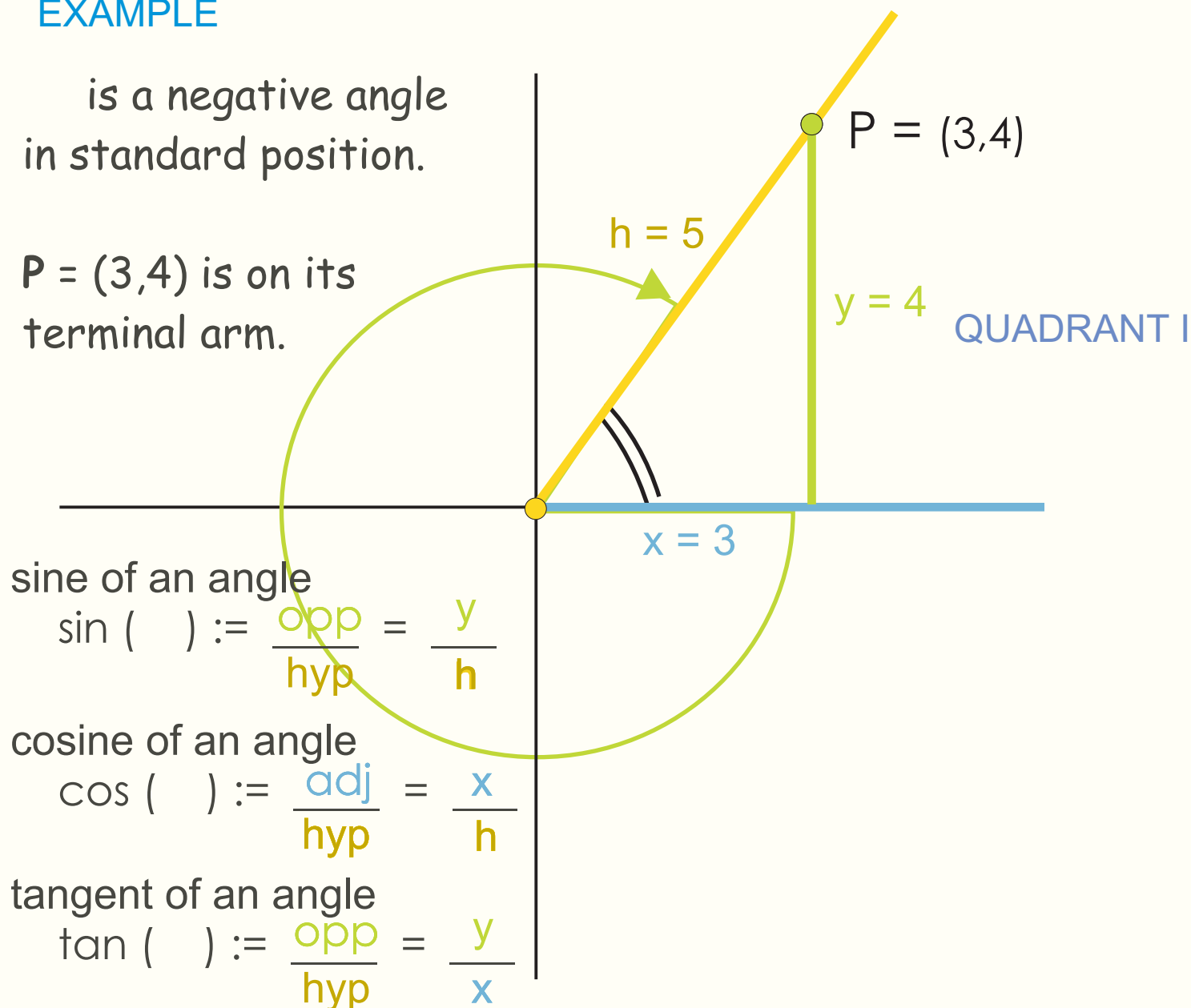
THE TRIGONOMETRIC MEASURES OF NEGATIVE ANGLES

THE TRIGONOMETRY OF ANGLES IN QUADRANT I

EXAMPLE

is a negative angle
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$P = (3,4)$ is on its
terminal arm.



Find the sine, cosine and tangent values of the angle .

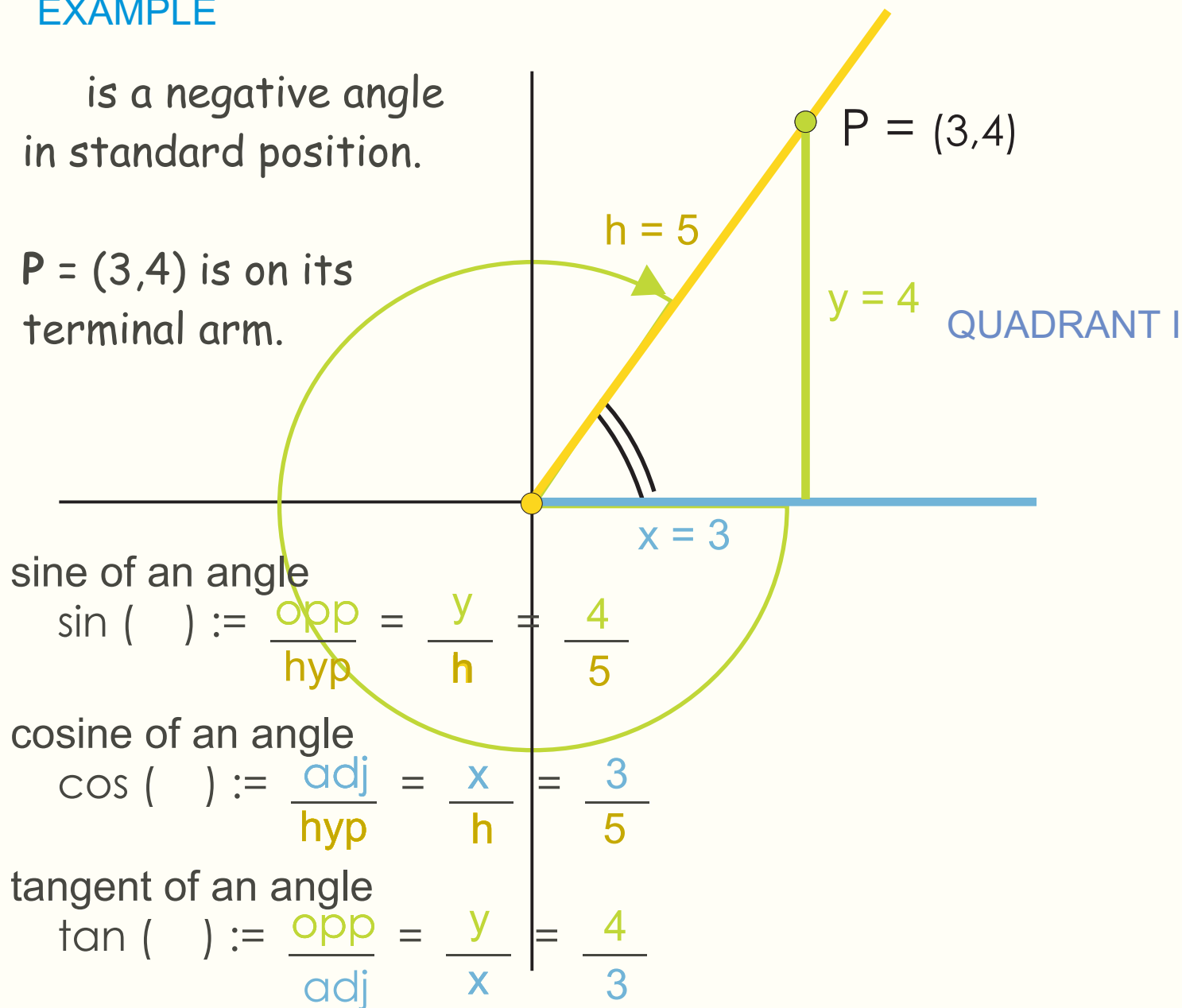
THE TRIGONOMETRIC MEASURES OF NEGATIVE ANGLES

THE TRIGONOMETRY OF ANGLES IN QUADRANT I

EXAMPLE

is a negative angle
in standard position.

$P = (3,4)$ is on its
terminal arm.



Find the sine, cosine and tangent values of the angle .

THE TRIGONOMETRIC MEASURES OF NEGATIVE ANGLES

THE CAST FORMULA

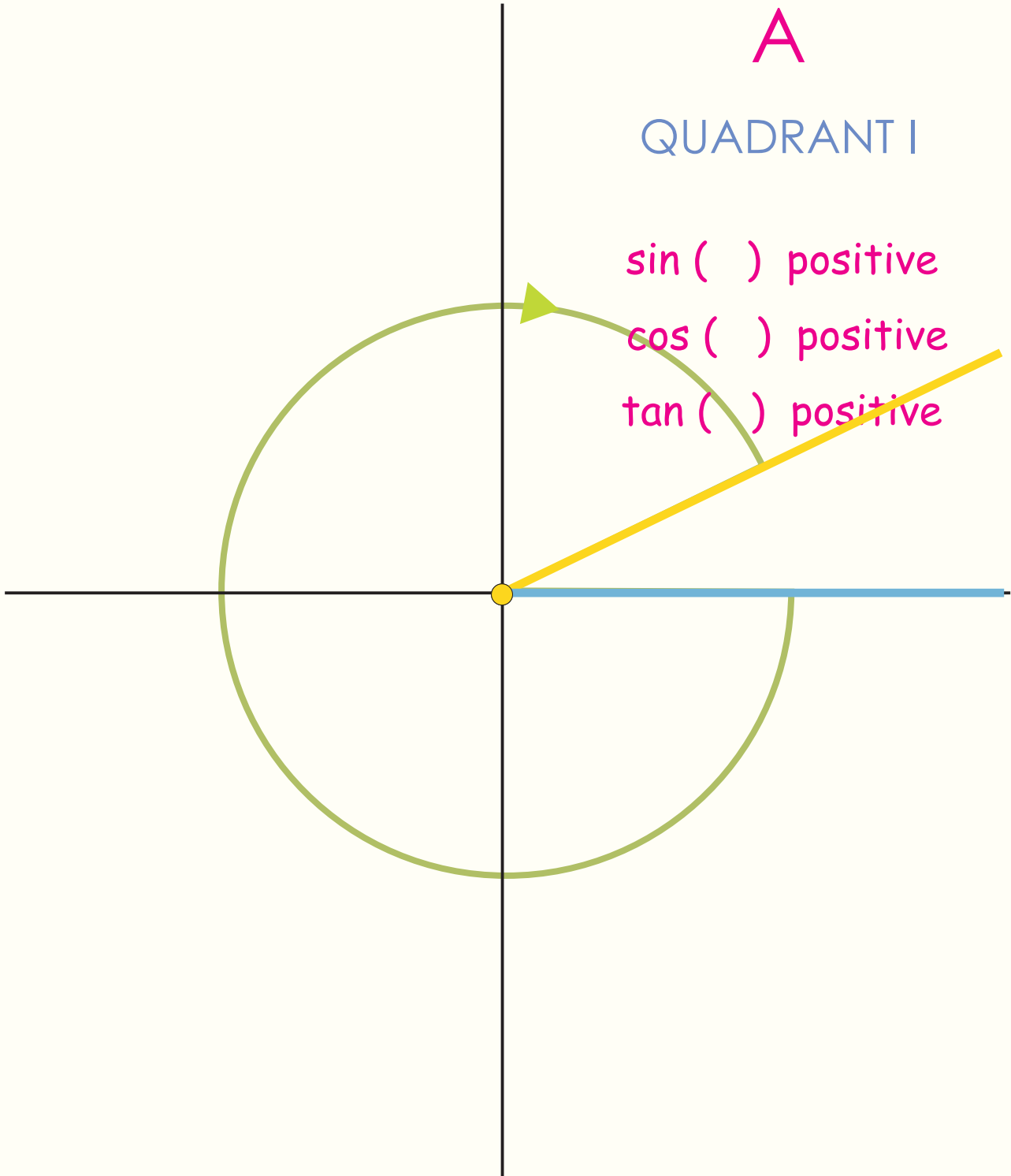
A

QUADRANT I

$\sin ()$ positive

$\cos ()$ positive

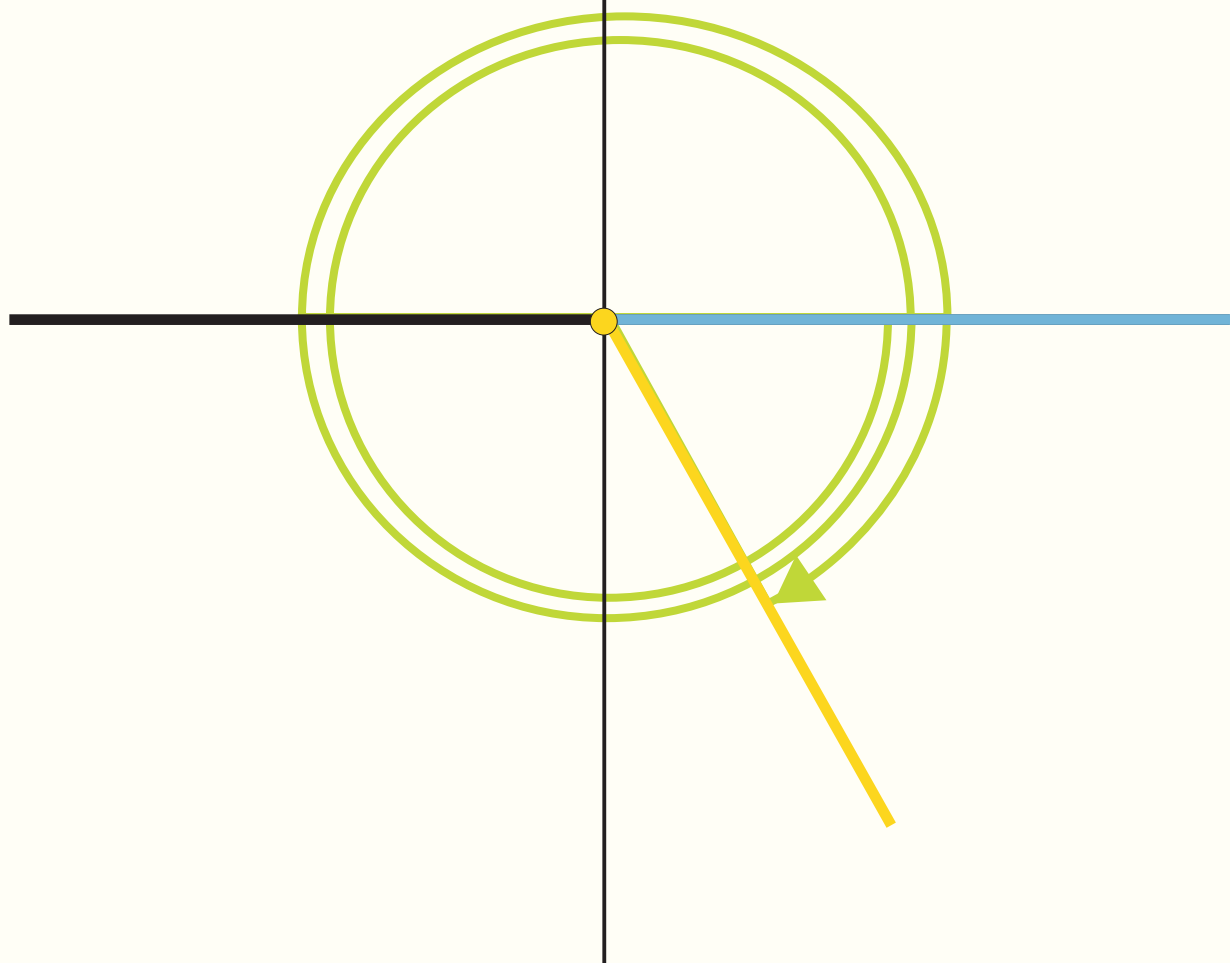
$\tan ()$ positive



THE TRIGONOMETRY OF ANGLES less than -360 degrees

EXAMPLE

$$= -780^\circ = -\frac{13}{3} \text{ radians}$$



Find the sine, cosine and tangent values of $-\frac{13}{3}$ radians .

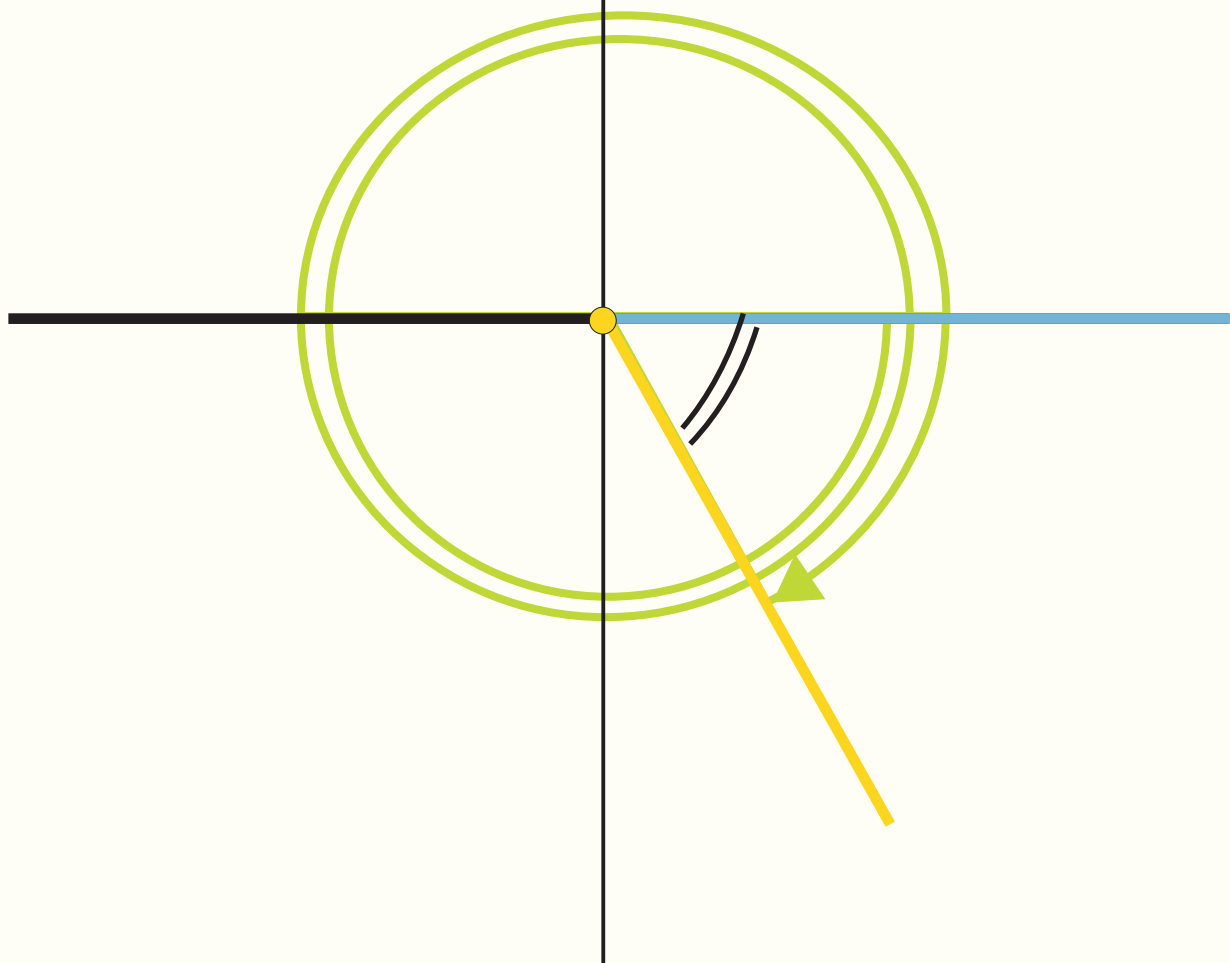
THE TRIGONOMETRIC MEASURES OF -780°

THE TRIGONOMETRY OF ANGLES less than -360 degrees

EXAMPLE

$$= -780^\circ = -\frac{13}{3} \text{ radians}$$

$$= 60^\circ = \frac{\pi}{3} \text{ radians}$$



Find the sine, cosine and tangent values of $-\frac{13}{3}$ radians .

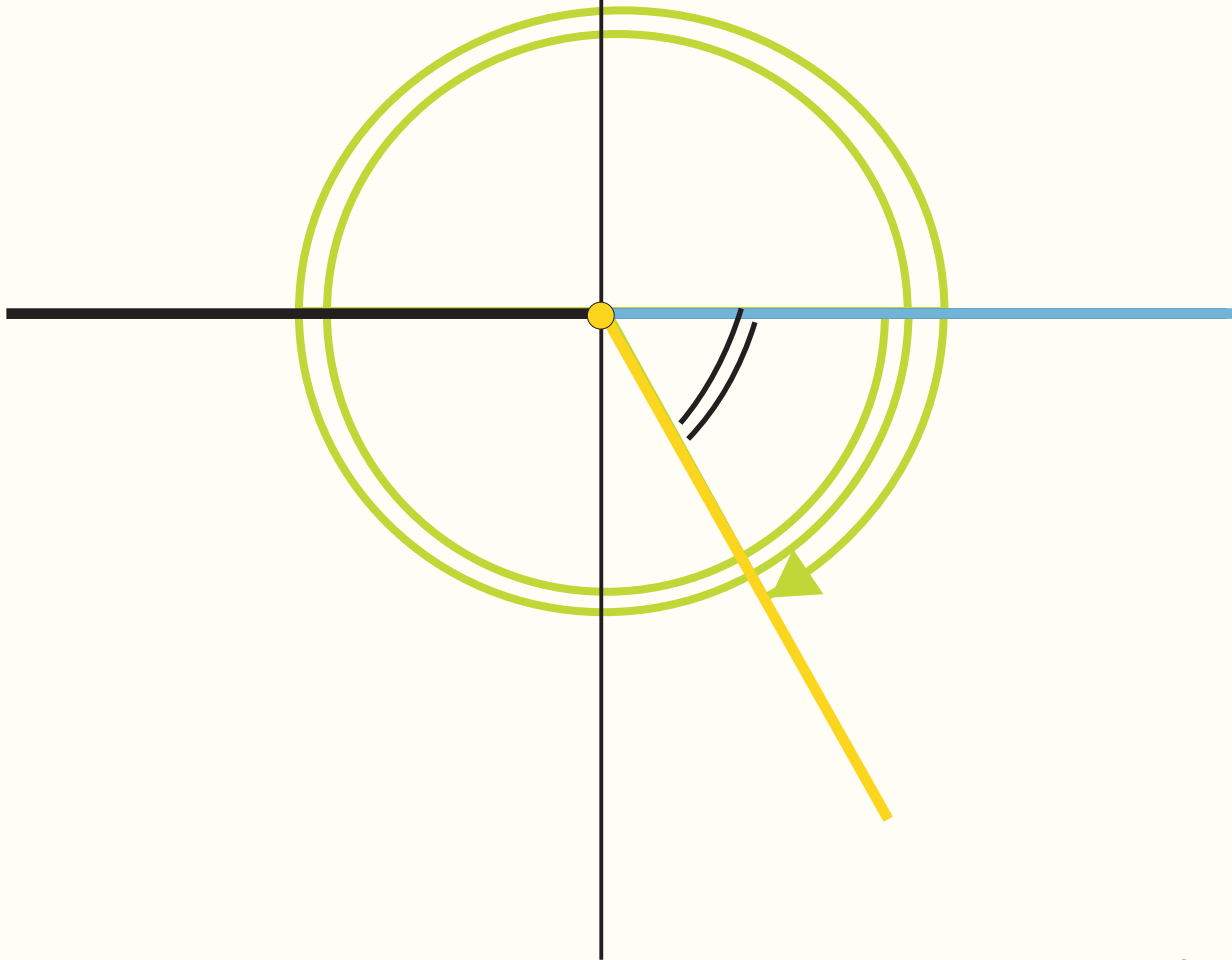
THE TRIGONOMETRIC MEASURES OF -780°

THE TRIGONOMETRY OF ANGLES less than -360 degrees

EXAMPLE

$$\begin{aligned} &= -780^\circ = -\frac{13}{3} \text{ radians} \\ &= 60^\circ = \frac{\pi}{3} \text{ radians} \end{aligned}$$

Evaluate the trigonometric measures of $-\frac{13}{3}$ using the sides of a triangle containing its related angle.



Find the sine, cosine and tangent values of $-\frac{13}{3}$ radians.

THE TRIGONOMETRIC MEASURES OF -780°

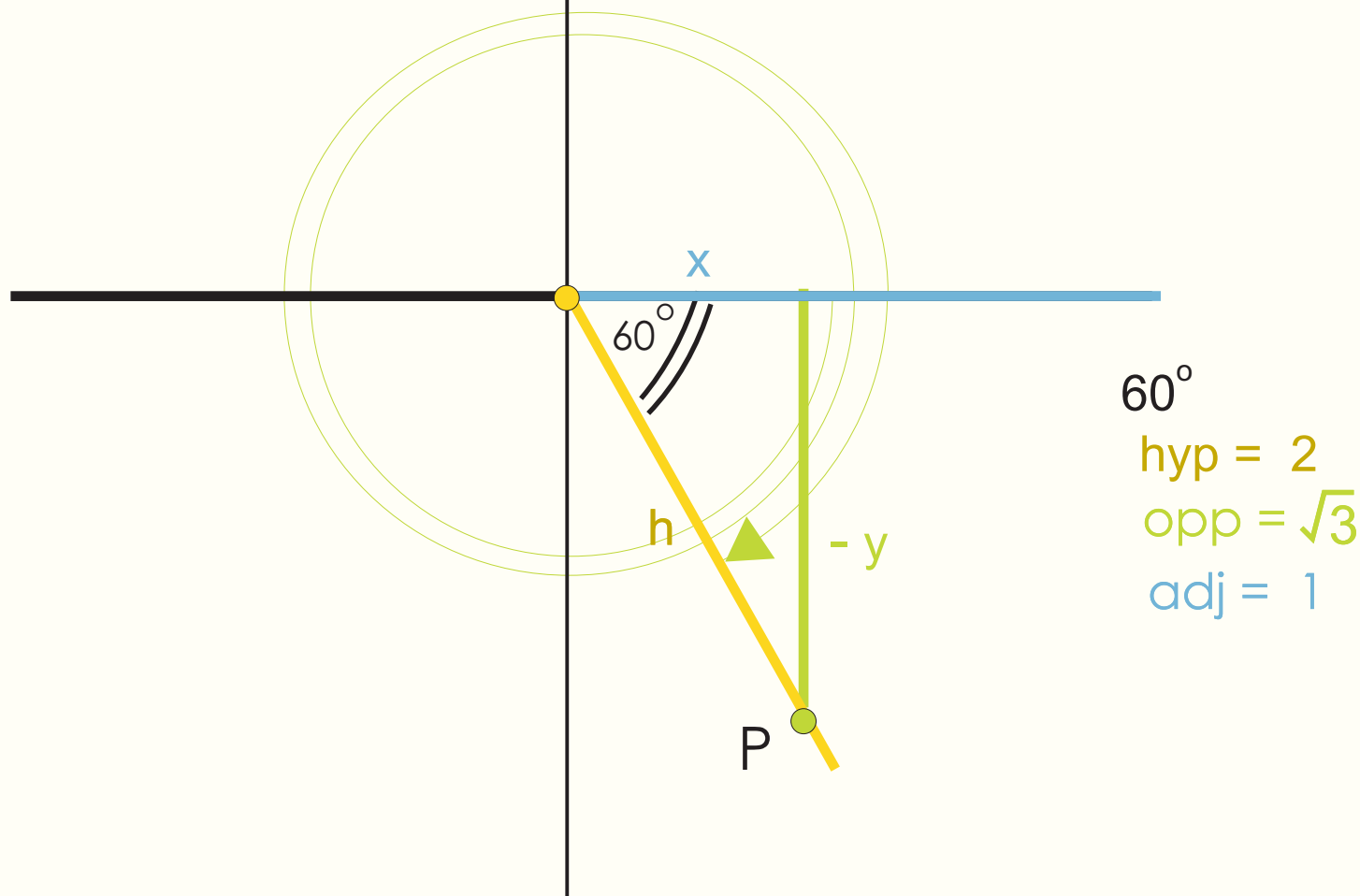
THE TRIGONOMETRY OF ANGLES less than -360 degrees

EXAMPLE

$$= -780^\circ = -\frac{13}{3} \text{ radians}$$

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Evaluate the trigonometric measures of $-\frac{13}{3}$ using the sides of a triangle containing its related angle.



Find the sine, cosine and tangent values of $-\frac{13}{3}$ radians.

THE TRIGONOMETRIC MEASURES OF $-\frac{13}{3}$

THE TRIGONOMETRY OF ANGLES less than -360 degrees

EXAMPLE

$$= -780^\circ = -\frac{13}{3} \text{ radians}$$

$$= 60^\circ = \frac{\pi}{3} \text{ radians}$$

sine of an angle

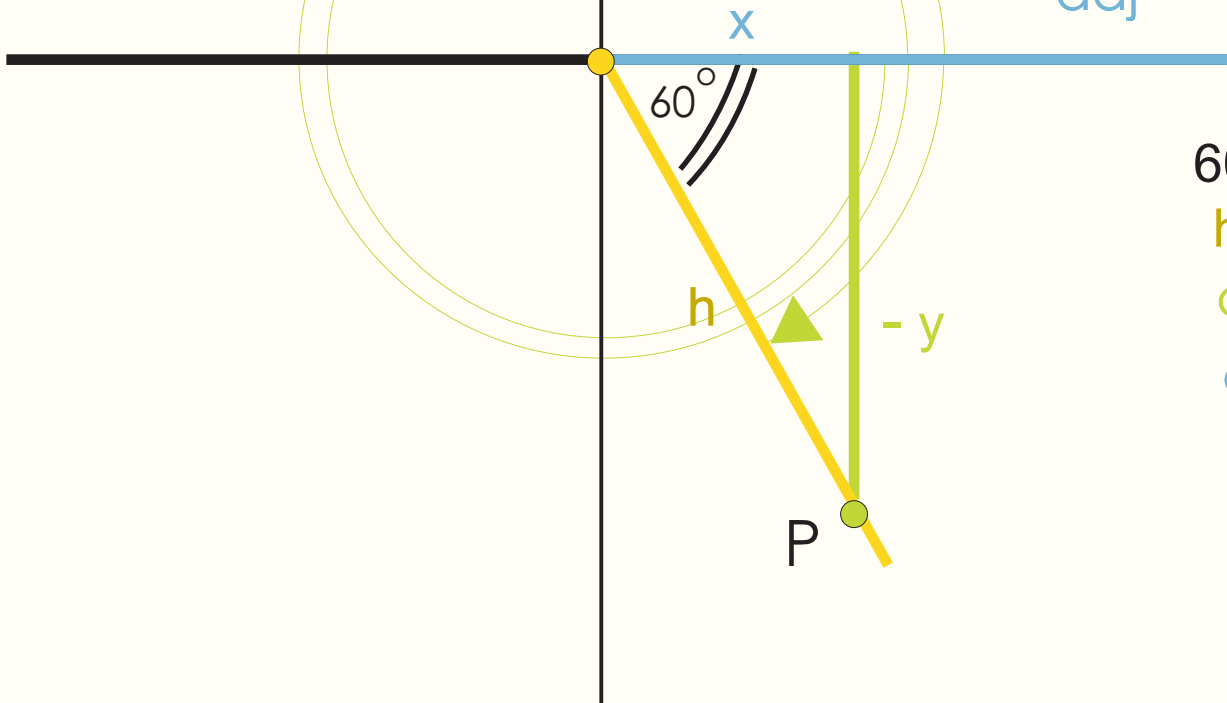
$$\sin () := \frac{\text{opp}}{\text{hyp}} = \frac{-y}{h} = \frac{-\sqrt{3}}{2}$$

cosine of an angle

$$\cos () := \frac{\text{adj}}{\text{hyp}} = \frac{x}{h} = \frac{1}{2}$$

tangent of an angle

$$\tan () := \frac{\text{opp}}{\text{adj}} = \frac{-y}{x} = \frac{-\sqrt{3}}{1}$$



60°

$$\text{hyp} = 2$$

$$\text{opp} = \sqrt{3}$$

$$\text{adj} = 1$$

Find the sine, cosine and tangent values of $-\frac{13}{3}$ radians .

THE TRIGONOMETRIC MEASURES OF -780°

THE **C A S T** FORMULA
- for all angles

S

QUADRANT II

$\sin (\)$ positive
 $\cos (\)$ negative
 $\tan (\)$ negative

A

QUADRANT I

$\sin (\)$ positive
 $\cos (\)$ positive
 $\tan (\)$ positive

$\sin (\)$ negative
 $\cos (\)$ negative
 $\tan (\)$ positive

QUADRANT III

T

$\sin (\)$ negative
 $\cos (\)$ positive
 $\tan (\)$ negative

QUADRANT IV

C

