

Turn It Around

Find matching angles and switch between degrees and radians.

HIGH SCHOOL • MA.912.T.2.1

MA.912.T.2.1 "Given any positive or negative angle measure in degrees or radians, identify its corresponding angle measure between 0° and 360° or between 0 and 2π . Convert between degrees and radians."

NAME _____

DATE _____

ONE FULL TURN

To find a corresponding angle, add or subtract full turns until the measure is at least 0 and less than one full turn. One full turn is 360° or 2π radians. To convert, multiply degrees by $\pi/180$ or multiply radians by $180/\pi$.

WORKED EXAMPLE

Find the corresponding angle between 0° and 360° for $-29\pi/10$ radians.

1. $-29\pi/10 \times 180/\pi = -522^\circ$
2. $-522^\circ + 720^\circ = 198^\circ$
3. 198° is at least 0° and less than 360° .

Answer: 198°

PRACTICE 6 problems

- 1** Find the corresponding angle between 0° and 360° for -515° .

ANSWER _____

- 2** Find the corresponding angle between 0° and 360° for 1110° .

ANSWER _____

- 3** Find the corresponding angle between 0 and 2π for $17\pi/6$ radians.

ANSWER _____

- 4** Find the corresponding angle between 0 and 2π for $-23\pi/4$ radians.

ANSWER _____

- 5** Convert $7\pi/12$ radians to degrees.

ANSWER _____

- 6** Convert 225° to radians.

ANSWER _____

APPLY IT Show your work

- 1** A video editor rotates a game logo 930° clockwise. Treat clockwise rotation as negative. What is the corresponding angle between 0° and 360° ? Write the angle in both degrees and radians.

WORK SPACE

ANSWER _____

- 2** A student designs a music visualizer that rotates a shape $23\pi/6$ radians counterclockwise. What is the corresponding angle between 0 and 2π ? Write the angle in both radians and degrees.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

An angle measures $-17\pi/3$ radians. Find its corresponding angle between 0 and 2π . Then explain why adding 6π works, but adding 4π does not give an angle in the requested interval.

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the corresponding angle between 0° and 360° for -515° .	205°
2	Find the corresponding angle between 0° and 360° for 1110° .	30°
3	Find the corresponding angle between 0 and 2π for $17\pi/6$ radians.	$5\pi/6$ radians
4	Find the corresponding angle between 0 and 2π for $-23\pi/4$ radians.	$\pi/4$ radians
5	Convert $7\pi/12$ radians to degrees.	105°
6	Convert 225° to radians.	$5\pi/4$ radians

PART 2 · APPLY IT

- 150° , $5\pi/6$ radians** The rotation is -930° . Adding 1080° gives 150° , and 150° converts to $5\pi/6$ radians.
- $11\pi/6$ radians, 330°** Subtract 2π , or $12\pi/6$, from $23\pi/6$ to get $11\pi/6$. Converting $11\pi/6$ gives 330° .

CHALLENGE

$\pi/3$ radians. Adding 6π gives $-17\pi/3 + 18\pi/3 = \pi/3$, and 6π is three full turns. Adding 4π gives $-5\pi/3$, which is not between 0 and 2π .

Accept equivalent simplified radian forms only when they name the same angle and meet the stated interval. Require degree or radian units where the prompt asks for them.