

STEM from Home

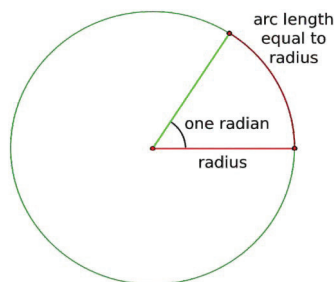
Let's Go Around In Circles!

Degrees and Radians

We measure angles in degrees. Degrees are usually denoted by $^{\circ}$ (symbol of degree). A right angle is an angle measuring 90 degrees, a straight line measures 180 degrees and a circle is made up of 360 degrees. We can say that 360° is a full circle, 180° is half circle and 90° is quarter of a circle. 1° is 360th of a circle.

Another method of measuring angles in a circle is Radian. While moving along the circumference of a circle, when the distance you travel is equal to the radius of the circle, the angle formed at the centre of a circle is equal to one radian.

Radians are represented by the symbol "rad". There are approximately 6.28 radians in a circle.

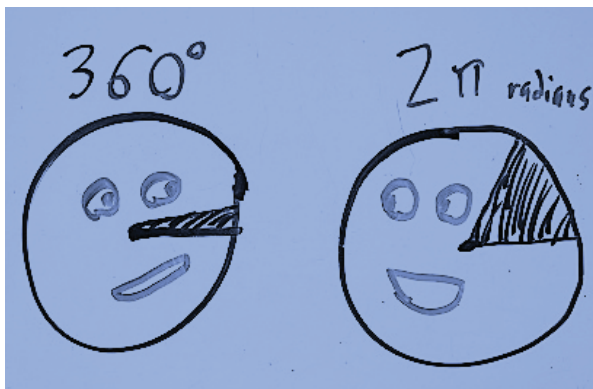


In this STEM pack we will explore the concept of radians and their relationship to degrees in a circle. Your challenges include developing a program in Python that will convert degrees to radians, solving a worksheet based on conversions of degrees to radians and vice versa. Finally, you will apply your learning gained in the main task to attempt a coding challenge.

Main Activity: Convert Degrees To Radians

Introduction

Develop a program in Python that will convert degrees to radians.



Pre-Work Reading

Go through any or all the following link(s) to learn the more about degrees and radians.

- [What are Radians?](#)
- [What Are Degrees and Radians?](#)
- [Radian](#)
- [Visually understand radian](#)
- [Radian facts for kids](#)

What You Will Learn

- A computer connected with high-speed internet
- An email id
- A modern browser like Microsoft Edge or Google Chrome

What you will Need

- How to use trinket.io for coding and testing the programs
- Basics of programming in Python like
 - ▶ Defining variables
 - ▶ Importing modules

- ▶ Accepting user inputs
- ▶ Performing calculations
- ▶ Displaying outputs

Getting Started

You can access [guidelines for the activity](#) here.

Access the activity by clicking [here](#).

Bonus Activities:

Explore How Degrees, Radians and Circles are Related

Introduction

Start with watching this [video](#)

You have learnt that 360 degrees are equal to one full circle. The same applies to when we measure angles in radians. 2π radians are equal to one full circle. So, technically, 360 degrees are equal to 2π radians.

In this activity you will explore how degrees, radians, and circles are related.

What You Will Learn

1. Converting degrees and radians
2. Converting radians to degrees

Getting Started

Access [Worksheet- Explore How Degrees, Radians And Circles Are Related here](#).

What You Will Need

Worksheet- Explore How Degrees, Radians and Circles Are Related

Challenge Activity: Convert Radians to Degrees

Problem Statement

Develop a Python program to convert radians to degrees.

Challenge

You have already written a code to convert degrees to radians. Now write a program to do the opposite of it, i.e., to convert radians to degrees.

A simple solution and flowchart for your help are provided here.

Logical solution

Given that: 2π radians = 360°

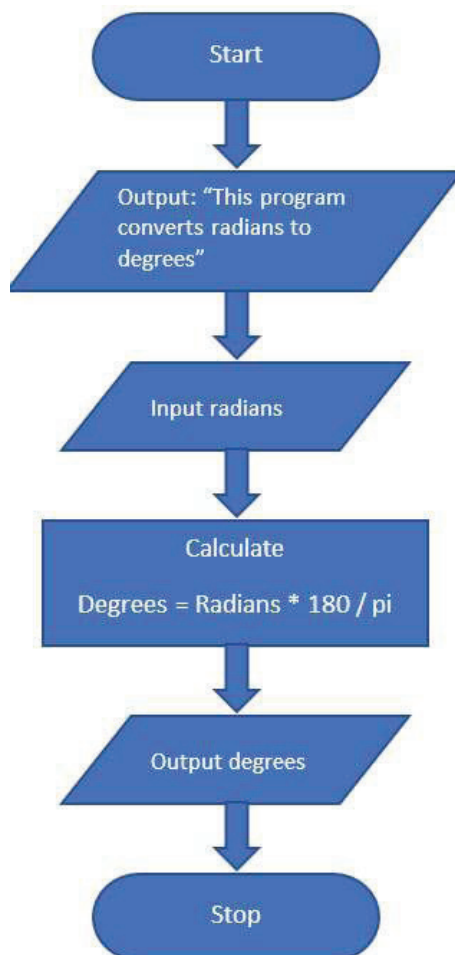
Therefore,

π Radians = 180 Degrees (or π radians = 180°)

This implies that: 1 radian = $180 / \pi$ degrees

Thus, to convert from radians to degrees, multiply the radians by 180 and divide by π .

Flowchart



Share your final project.