Answers: Introduction to radians

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Summary

Answers to the questions relating to the guide on radians.

*These are the answers to* [*Questions: Introduction to radians*](../questions/qs-radians.qmd)*.*

**Please attempt the questions before reading these answers!**

## Q1

1.1. Multiplying $30^{∘}$ by $π$ and dividing by $180$ gives $\frac{30π}{180} rad=\frac{π}{6} rad=0.524 rad$ to three decimal places.

1.2. Multiplying $105^{∘}$ by $π$ and dividing by $180$ gives $\frac{105π}{180} rad=\frac{7π}{12} rad=1.833 rad$ to three decimal places.

1.3. Multiplying $298^{∘}$ by $π$ and dividing by $180$ gives $\frac{298π}{180} rad=\frac{149π}{90} rad=5.201 rad$ to three decimal places.

1.4. Multiplying $61^{∘}$ by $π$ and dividing by $180$ gives $\frac{61π}{180} rad=1.064 rad$ to three decimal places.

1.5. Multiplying $353^{∘}$ by $π$ and dividing by $180$ gives $\frac{353π}{180} rad=6.161 rad$ to three decimal places.

1.6. Multiplying $197^{∘}$ by $π$ and dividing by $180$ gives $\frac{197π}{180} rad=3.438 rad$ to three decimal places.

## Q2

2.1. Multiplying $\frac{π}{3} rad$ by $180$ and dividing by $π$ gives $\frac{180π}{3π}^{∘}=60^{∘}$.

2.2. Multiplying $\frac{2π}{3} rad$ by $180$ and dividing by $π$ gives $\frac{360π}{3π}^{∘}=120^{∘}$.

2.3. Multiplying $\frac{π}{7} rad$ by $180$ and dividing by $π$ gives $\frac{180π}{7π}^{∘}=25.714^{∘}$ to three decimal places.

2.4. Multiplying $\frac{5π}{7} rad$ by $180$ and dividing by $π$ gives $\frac{900π}{7π}^{∘}=128.571^{∘}$ to three decimal places.

2.5. Multiplying $5 rad$ by $180$ and dividing by $π$ gives $\frac{900}{π}^{∘}=286.479^{∘}$ to three decimal places.

2.6. Multiplying $\frac{3}{4} rad$ by $180$ and dividing by $π$ gives $\frac{540}{4π}^{∘}=\frac{135}{π}^{∘}=42.972^{∘}$ to three decimal places.

## Q3

3.1. In this case, the length of the arc is $\frac{7π}{8}=2.749$ (to 3dp) and the area of the sector is $\frac{49π}{16}=9.621$ (to 3dp).

3.2. In this case, the length of the arc is $\frac{π}{2}=1.571$ (to 3dp) and the area of the sector is $\frac{π}{12}=0.262$ (to 3dp).

3.3. In this case, the length of the arc is $14π=43.982$ (to 3dp) and the area of the sector is $\frac{525π}{2}=824.668$ (to 3dp).

## Version history and licensing

v1.0: initial version created 08/23 by Ifan Howells-Baines, Mark Toner as part of a University of St Andrews STEP project.

* v1.1: edited 05/24 by tdhc.

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