

# 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](#).*

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

## Q1

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

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

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

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

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

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

## Q2

2.1. Multiplying  $\frac{\pi}{3} \text{ rad}$  by 180 and dividing by  $\pi$  gives  $\frac{180\pi^\circ}{3\pi} = 60^\circ$ .

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

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

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

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

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

### Q3

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

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

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

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### 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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