Knowledge Rich Curriculum Plan

Year 13 Radian measure

Lesson/Learning Sequence	Intended Knowledge: *Students will know that…*	Tiered Vocabulary	Prior Knowledge: *In order to know this students, need to already know that…*	Assessment
Lesson Objective: Lesson Objective: To learn how to convert degrees into radians.	• *Students will know that radians are a measurement of angles similar to degrees.* • *Students will know some important angles in radians.* • *Students will know how to convert radians into degrees by multiplying by 180 and dividing by pi.* • *Students will know how to convert degrees into radians by multiplying by pi and dividing by 180.* • *Students will know how to use a calculator in radians mode to find sin, cos or tan of an angle measured in radians.*	Radians - The SI unit for measuring angles	Students need to know basic angles such as 360 degrees in a full turn. Students need to know exact trigonometry. Students need to know how to use the calculator to find sin, cos or tan of an angle measured in degrees. Students need to know how to multiply and divide by fractions.	
Lesson objective: To learn how to use radians in trigonometric graphs and ratios.	• *Students will know how to sketch the graphs of sine, cosine and tangent using radians in a given range.* • *Students will know exact values of some trigonometric ratios of angles measured in radians.*		Students need to know basic angles such as 360 degrees in a full turn. Students need to know exact trigonometry. Students need to know how to use the calculator to find sin, cos or tan of an angle measured in degrees. Students need to know how to multiply and divide by fractions. Students need to know how to convert between degrees and radians. Students will know how to use a calculator in radians mode to find sin, cos or tan of an angle measured in radians. Students need to have a basic understanding of radians.	
Lesson objective: To learn how to find the arc length of a sector of a circle.	• *Students will know that using radians greatly simplifies the formula for arc length.* • *Students will know and be able to use the formula for finding the arc length - $l=r\vartheta$, where r is the radius of the circle and ϑ is the angle, in radians, contained by the sector.* • *Students will know how to use the formula to find the angles subtended by the arc at the centre of the circle.* • *Students will know how to use the formula to find the radius of a circle.* • *Students will know how to use the formula to solve problems involving algebra.* • *Students will know how to use the formula to solve problems involving triangles.* • *Students will know that the formula for the arc length can only be used with radians and not degrees.*	Sector - the plane figure enclosed by two radii of a circle or ellipse and the arc between them.	Students need to know how to convert between degrees and radians. Students need to know how to substitute values into formulae. Students need to know how to rearrange formulae. Students need to know how to use trigonometry on right-angled triangles. Students need to know how to use the sine rule to find missing sides and angles. Students need to know how to use the cosine rule to find missing sides and angles. Students need to know find missing angles in a triangle or on a straight line with radians. Students need to know how to solve trigonometric equations using either CAST or graphs.	

To learn how to find the area of sectors.	• Students will know that you can find the area of a segment by subtracting the area of a triangle away from the area of sector. • Students will know how to use the area of a segment in a circle of radius r is A=½ r²(θ-sinθ). • Students will know how to use the cosine rule or sine rule to find missing sides or angles in a sector and use this to find the area of a segment. • Students will know that you can only use this formula with radians. • Students will know how to use the area of a segment formula to solve problems.		Students need to know how to convert between degrees and radians. Students need to know how to substitute values into formulae. Students need to know how to rearrange formulae. Students need to know how to use trigonometry on right-angled triangles. Students need to know how to use the sine rule to find missing sides and angles. Students need to know how to use the cosine rule to find missing sides and angles. Students need to know find missing angles in a triangle or on a straight line with radians. Students need to know how to solve trigonometric equations using either CAST or graphs.	
To learn how to find the area of segments.	• Students will know that you can find the area of a segment by subtracting the area of a triangle away from the area of sector. • Students will know how to use the area of a segment in a circle of radius r is A=½ r²(θ-sinθ). • Students will know how to use the cosine rule or sine rule to find missing sides or angles in a sector and use this to find the area of a segment. • Students will know that you can only use this formula with radians. • Students will know how to use the area of a segment formula to solve problems.		Students need to know how to find the arc length of a sector. Students need to know how to find the area of a sector. Students need to know how to find the area of a triangle using the sine rule. Students need to know how to use the sine rule to find missing sides and angles. Students need to know how to use the cosine rule to find missing sides and angles. Students need to know how to convert between degrees and radians.	
To learn how to solve trigonometric equations using radians.	• Students will know how to solve trigonometric with radians. • Students will know how to solve trigonometric with radians involving multiple steps. • Students will know how to manipulate a range of values involving radians. • Students will know how to use trigonometric graphs and the CAST diagram with radians.		Students need to know how to use trigonometric identities to simplify expressions and equations. Students need to know how to solve trigonometric equations using either CAST or graphs. Students need to know how to find multiple solutions to trigonometric equations using a given range. Students need to know how to convert between radians and degrees.	
To learn how to use small angle approximations.	• Students will know how to use radians to find approximations for the values of sinθ , cosθ and tanθ. • Students will know that when θ is small and measured in radians $\sin\theta \approx \theta, \cos\theta \approx 1-\theta^2/2 \approx 1, \tan\theta \approx \theta$. • Students will know how and why these approximations work by looking at the graphs of y=sinθ, y=cosθ and y=tanθ for values of θ close to 0. • Students can use small approximations to solve problems.		Students need to know how to substitute values into formulae. Students need to know how to rearrange formulae.	