Week 10
Term 04
2015

Learning Brief

SME4
Further Trigonometry and Further Calculus

Goals

$$\arcsin x = \int_0^x \frac{1}{\sqrt{1-z^2}}\,dz, \quad |x| < 1$$
$$\arccos x = \int_x^1 \frac{1}{\sqrt{1-z^2}}\,dz, \quad |x| \leq 1$$
$$\arctan x = \int_0^x \frac{1}{z^2+1}\,dz,$$
$$\operatorname{arccot} x = \int_x^\infty \frac{1}{z^2+1}\,dz,$$
$$\operatorname{arcsec} x = \int_1^x \frac{1}{z\sqrt{z^2-1}}\,dz, \quad x \geq 1$$
$$\operatorname{arcsec} x = \pi + \int_x^{-1} \frac{1}{z\sqrt{z^2-1}}\,dz, \quad x \leq -1$$
$$\operatorname{arccsc} x = \int_x^\infty \frac{1}{z\sqrt{z^2-1}}\,dz, \quad x \geq 1$$
$$\operatorname{arccsc} x = \int_{-\infty}^x \frac{1}{z\sqrt{z^2-1}}\,dz, \quad x \leq -1$$

Unit Goals:

- Use calculus involving the inverse trig functions
- apply a variety of integration techniques

Further Calculus:

- integration of inverse trigonometric functions

Theoretical Components

References:

PDF file - Further Calculus Pages 12-16

Text Book - 12 Specialist Maths 5E

YouTube - Links in the PDF file

Knowledge checklist:

☐ derive the formulas for integrating arcsin, arccos, arctan and arccot.

☐ using the results for the derivatives of arcsin, arccos, arctan etc to work out integrals

Videos:
http://patrickjmt.com/integration-using-inverse-trigonometric-functions-ex-1/

http://patrickjmt.com/integration-using-inverse-trigonometric-functions-ex-2/

Practical Components

12 Specialist Maths JacPlus

5E Q1 Q2(f,h,j) Q3 Q4 and Q7 (as many as you can)

Q12 Q13

Exercise 2 from PDF file

Exercise 3 from PDF file

Investigation

Ex 5E:
Answer Q11. Show all working.

Q/F/O

Catch up week: attempt to finish WK09 work on derivatives of inverse trig functions.
Review your work on Definite and Indefinite integrals.