α	β	γ	δ	ε	ζ	η	θ	ι	κ	λ	μ	ν	ξ	o	π	ρ	σ	τ	υ	φ	χ	ψ	ω

"Always borrow money from a pessimist, they won't expect it back"

O Wilde

Further Maths A2 (M2FP2D1) Assignment δ (delta) A

due w/b 9th Oct

DRILL

Drills are the very basic techniques you need to solve maths problems. You need to practise these until you can do them quickly and accurately. Answers are not provided for drill questions.

A. Find the solution set of:

1) $|x-2|>4$ 2) $|4-x^2|\leq 3$ 3) $2x+|x|<6$ 4) $|8-2x-x^2|<8$

B. Integrate the following

1) $\sin^3 x$ 2) $\frac{x^2+3x}{(x-2)(x-3)}$ 3) $(e^x+x)^2$

PREPARATION

Every week you will be required to do some preparation for future lessons, to be advised by your teacher.

CURRENT WORK AND CONSOLIDATION

Polar coordinates

1. Obtain the polar form of the following Cartesian equation, where a is a postitve constant

a) $y^2=x(a-x)$ b) $xy=4a^2$ c) $(x^2+y^2)^2=2a^2xy$

2. Express the polar equations in Cartesian form

a) $r=4\sin\theta$ b) $r=\frac{3}{2\cos\theta}$ c) $r^2=2\operatorname{cosec}\theta$

3. Express the Cartesian equations in polar form. Give each answer in the form $r=f(\theta)$

a) $x=4$ b) $x^2+y^2=4y$ c) $(x+y)^2=1$

4. Show that

$$\frac{2}{4r^2-1}\equiv\frac{1}{2r-1}-\frac{1}{2r+1}$$

Hence, find the sum to *n* terms of

$$\sum_{r=1}^{n}\frac{2}{4r^2-1}$$

5. Show that

$$\frac{r}{r+1}-\frac{r-1}{r}\equiv\frac{1}{r(r+1)}$$

Hence, find the sum to *n* terms of

$$\sum_{r=1}^{n} \frac{1}{r(r+1)}$$

6. Show that

$$\frac{2}{r(r+1)(r+2)} \equiv \frac{1}{r(r+1)} - \frac{1}{(r+1)(r+2)}$$

Hence find the sum to *n* terms of

$$\sum_{r=1}^{n} \frac{2}{r(r+1)(r+2)}$$

7. Find the general solution of the differential equation

$$\frac{dy}{dx} + \frac{y}{x} = \cos x$$

8. Find the general solution of the differential equation

$$\frac{dy}{dx} - 2y \operatorname{cosec} x = \tan \frac{x}{2}, 0 < x < \pi$$

9. Given that when $y = 0, x = 1$. Find the particular solution of the differential equation

$$\frac{dy}{dx} + 2y = e^{-2x}(x^3 + x^{-1})$$

10. Given that when $y = 1, x = 1$. Find the particular solution of the differential equation

$$x\frac{dy}{dx} + 3y = e^x$$

11. Find the general solution of the second order differential equation

$$4\frac{d^2y}{dx^2} + 4\frac{dy}{dx} + 2y = \sin x + \cos x$$

12. Find the particular solution of the second order differential equation

$$\frac{d^2y}{dx^2} + 6\frac{dy}{dx} + 25y = 6\sin x ; \frac{dy}{dx} = y = 0, at\ x = 0$$

Answers:

(1) (2)(3)

(4) $\frac{n}{2n+1}$

(5) $\frac{n}{n+1}$

(6) $\frac{n(n+3)}{4(n+1)(n+2)}$

(7) $xy = x\sin x + \cos x + C$

(8) $y\cot^2\frac{x}{2} = 2\ln\left|\sin\frac{x}{2}\right| + C$

(9) $ye^{2x} = \frac{x^4}{4} + \ln|x| + C$

(10) $y = x^{-3}(e^x(x^2 - 2x + 2) + 1 - e)$

(11) $y = e^{-\frac{1}{2}x}\left(A\cos\frac{x}{2} + B\sin\frac{x}{2}\right) + \frac{1}{10}\sin x - \frac{3}{10}\cos x$

(12) $y = \frac{1}{68}e^{-3x}(4\cos 4x - \sin 4x) + \frac{1}{17}(4\sin x - \cos x)$

BHASVIC MATHS

ASSIGNMENT COVER SHEET delta

Name ..... Maths Teacher .....

Question	Done	Backpack	Ready for test	Notes
Drill A				
Drill B				
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				