

#### 12 Mathematics Methods 2022

## Test 3 – Calculus of trig, exponential and log functions

#### **Section 1: Calculator-free**

16 mins Time allowed:	Maximu	15 marks
Name:	Teacher:	Foster   Kelly

#### Instructions:

- Show all working clearly.
- Sufficient detail must be shown for marks to be awarded for reasoning.
- A formula sheet will be provided.
- No calculators or personal notes are permitted.

Differentiate the following functions with respect to x.

a) 
$$y = \cos[\ln x]$$

Question 2



a) Calculate the following.

$$i) \qquad \int \frac{2-5x^2}{5x^3-6x-9} \, dx$$

II) 
$$\int_{-\infty}^{\infty} r \sin(3r) dr$$

### 4 marks

# Question 3 [1, 3, 4 marks]

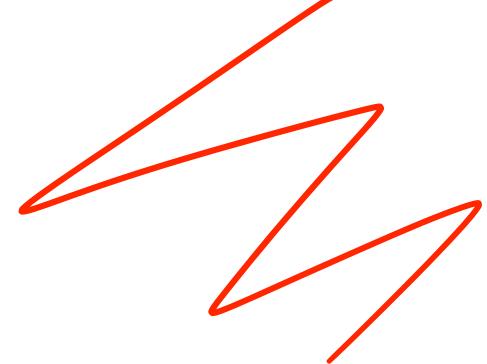
Cedric the cyclist travels up and down hills with his velocity ( $kmh^{-1}$ ) after t hours given by

$$v(t) = 20 + 5\sin(3\pi t)$$

a) Determine a function for Cedric's acceleration.

b) Determine his maximum acceleration and the first time this occurs for t>0.

c) Calculate Scaliff and graph of the first 2 hours



## Question 4 [6 marks]

Find the area enclosed, in the first quadrant, between  $y=2e^x$ ,  $x=\frac{1}{2}\log_e y$  and the y-axis.