MATHEMATICS DEPARTMENT

Resource Free Trigonometric Functions Differentiation of Exponential and Year 12 Methods - Test Number 1 - 2017



ALL SAINTS'
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	18		yarks:
	20 minutes	:рәм	ollA əmi
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	c) $y = 3x^2e^{2x}$ [simplify your answer]
	d) $y = 3\pi \tan(1+e)^2$
	[3,3,3,3 = 12 Marks]
2.	[3,3,3,3 = 12 Marks] Find the equation of the tangent to the curve defined by $h = (e^{2t})(e^t + 1)^2$ at the point (0,4).
2.	Find the equation of the tangent to the curve defined by $h = (e^{2t})(e^{t} + e^{2t})$
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Page Number : 2

February 2017

All Saints' College Mathematics

[2,4 = 6 marks]

End of Test

All Saints' College Mathematics Page Number : 7 February 2017

MATHEMATICS DEPARTMENT

Resource Rich Trigonometric Functions [6 Marks] Differentiation of Exponential and Year 12 Methods - Test Number 1 - 2017



Теасhет:	Name:
97	Marks:
25 minutes	:bəwollA əmiT
e allowed a ClassPad and 1 page of notes (both sides).	Instructions: You a
ill be supplied with a formula sheet.	iw noY
e amount of a dangerous 'recreational drug' (in mg) left unabsorbed in the	1) It is known that th
ie smount of a dangerous recreational drug. (in mg) left unabsorbed in the	T) It is known that th

a) Show that the rate of change of U with respect to time is proportional to the amount of the

Page Number: 3

All Saints' College Mathematics

drug remaining.

 $U = 100e^{-0.05t}$

bloodstream after t hours is given by

February 2017

February 2017 Page Number : 6 All Saints' College Mathematics

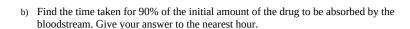
b) When during the interval 1 2 2 2 the particle travels with a speed of 1 cms $^{-1}$.

modelled by the equation x = $\frac{3\pi}{4}$. Use a calculus method to determine:

4) The displacement, x cm, of a particle from a fixed point O, t seconds after it is released is

a) The velocity of the particle after 2 seconds,

[3,3 = 6 marks]



[4,4 = 8 Marks]

c) Find an expression that describes the amount of the drug absorbed by the bloodstream after t hours.

$$[3,2,1 = 6 \text{ Marks}]$$

2) a) The normal to a given curve at a point is defined as the perpendicular to the tangent at that point. Find the equation of the normal to the curve $y = \frac{e^x}{2 - x}$ at the point where x = 1.

b) y = x + 1 is a tangent to the curve $y = ax + b \sin x$ at the point $(\frac{\pi}{2}, 1 + \frac{\pi}{2})$. Find a and b.

- 3) Fishermen monitored the growth of the population of sardines in a particular location over a 30 year period from 1985 when the population was estimated to be 2 000 000 . They found that the population was continuously growing with the instantaneous rate of increase in the population $\frac{dP}{dt} = \frac{P}{20}$ per year $\frac{P}{dt}$, always close to $\frac{P}{20}$.
 - a) Estimate the population of sardines at the end of the 30 year period.

b) If this pattern of growth continues estimate the population of sardines in 2040.