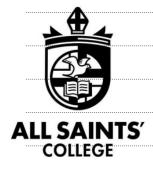


## **MATHEMATICS DEPARTMENT**

## Year 12 Methods - Test Number 1 - 2016 Differentiation of Exponential and Trigonometric Functions Resource Free

Name:	reacner:
Marks:	17
Time Allowed:	15 minutes
Instructions: You	u are NOT allowed any Calculators or notes.
You	ı will be supplied with a formula sheet.
1. Find $\frac{dy}{dx}$ for	r
$a)  y = \frac{1}{2e}$	$oldsymbol{1}$
b) <i>V</i> = CO	$os(e^{x})$

c) <i>y</i> =	$3x^2e^{2x}$
d) 3ta	n(1+e) <sup>2</sup>
	[3,3,3,2 = 11 Mark
	equation of the tangent to the curve defined by $h = (t^2 - 1)(t - 1)$
	equation of the tangent to the curve defined by $h = (t^2 - 1)(t + t_0)$ point (1,0).
	equation of the tangent to the curve defined by $h = (t^2 - 1)(t - 1)$



## **MATHEMATICS DEPARTMENT**

## Year 12 Methods - Test Number 1 - 2016 Differentiation of Exponential and Trigonometric Functions [6 Marks]

**Resource Rich** 

Name:	Teacher:
Marks:	28
Time Allowed:	30 minutes
	are allowed a ClassPad and 1 page of notes (both sides). vill be supplied with a formula sheet.

1) The population of a colony of numbats is being monitored by a group of scientists from Murdoch University. The population , P, after t years is modelled by the equation

 $P=4000e^{-0.01t}$ 

a) What was the initial population of this colony of numbats?

b) Find the	e exponential gro	owth/decay of	this colony?	)
c) Find the	e population afte	r 5 years?		
	ow many years w he original popu		tion of numk	oats be half the
			ı	[1,2,2,2 = 7 Ma

2) An Olympic Ski Jumping slope has been designed so that it follows the curve:

$$y = 3\cos(\frac{\pi x}{4}) + 8$$
 for  $0 \le x \le 5$ , where x and y are both in metres.

a) What is the take-off angle at the end of the jump (to the nearest degree) remembering that  $m = \tan \theta$ ?

	ы Sketch the curve below:
	[4,2 = 6 Marks]
3)	Western Australia is suffering from a decrease in average annual $\frac{dR}{dt} =00975R$
	rainfall over time, t years, according to the formula $at$ .
	The first average annual rainfall measured in WA was 880mm.
	a) Find a formula for the average annual rainfall in this region.
	ы) Find the average annual rainfall after:
	i) 20 years

c) What is the rate at which the rainfall is decreasing after 100 years	
	[2,2,2,3 = 9 mar
	[2,2,2,3 - 9 IIIai
Differentiate each of the following with respect to x:	
$3x^2\sin(3x)$	

b)  $[1+\cos(2x)]^4$ 

ii) 100 years

$\frac{e^{3x}}{(1-5x^2)}$		
	**End of Test**  ***Extra space for working out***	[2,2,2 = 6 marks]