



Name: \_\_\_\_\_

## MATHEMATICS SPECIALIST 3CD

**SEMESTER 1      2010**

### TEST 3

	Questions	Reading Time	Working Time	Marks	Score
<b>Calculator Free</b>	<b>1 – 2</b>	<b>3 minutes</b>	<b>20 minutes</b>	<b>15</b>	
Calculator Assumed	3 - 5	5 minutes	35 minutes	28	
Total				43	

**1.** [5 marks]

Prove the following:  $\frac{1 + \sin A}{1 - \sin A} = 2 \tan^2 A + 1 + \frac{2 \tan A}{\cos A}$

**2.** [10 marks]

Find the equation of the tangents to the curve  $x^2 + y^2 = 5x$  where the line  $y = x - 2$  intersects it.



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**3.** [3 marks]

Find a counter example to the claim: 'A quadratic function of  $x$  is a function in which the highest power of  $x$  is 2'.

**4.** [4, 3, 4 marks]

(a) If  $x^3 + y^3 - 9xy = 0$ , determine  $\frac{dy}{dx}$  at (3, 0).

(b) Find  $\frac{dy}{dx}$  if  $x \sin y = 2xy$

(c) If  $x = e^t \cos t$  and  $y = \sin t + \cos t$ , determine  $\frac{dy}{dx}$  in its simplest form.

**5.** [2, 3, 4, 5 marks]

(a) Determine  $\int \cos^2(4x) dx$

(b) Determine  $\int \frac{x}{\sqrt{1-2x}} dx$  (Let  $u = 1-2x$ )

(c) Evaluate  $\int_0^1 \frac{x}{\sqrt{4-x^2}} dx$  by substituting  $x = 2 \sin \theta$

- (d) The figure shows part of the curve  $y = \sin x$ . Calculate the **exact** area of the shaded region.

