## 3C/3D 3C/3D



# MESTEX COTTEGE

## Semester Two Examination 2012

Question/Answer Booklet

### Section One: Calculator-free

			Геасћег Иапле:
pmb	Marking	1 2 most 10 102	Student Name:

Time allowed for this section

Reading time before commencing work: Firky (50) minutes Working time for this section: Firky (50) minutes

Material required/recommended for this section To be provided by the supervisor

This Question/Answer Booklet

Formula Sheet

To be provided by the candidate

Standard items: pens, pencils, pencil sharpener, eraser, correction fluid, ruler,

erothgilhgih

Special items:

#### Important note to candidates

No other items may be used in this section of the examination. It is your responsibility to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the examination room. If you have any unauthorised material with you, hand it to the supervisor before reading any further.

#### Year 12 3 C/D MAT Semester 2 Examination

#### Section One: Calculator-free

(50 Marks)

This section has **eight (8)** questions. Answer **all** questions. Write your answers in the space provided. Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue an answer.

#### Question 1 (2, 3, 2, 3 = 10 marks)

(a) Determine  $\frac{dy}{dx}$  in each of the following (there is no need to simplify answers)

(i) 
$$y = \frac{\sqrt{x^2 - 16}}{x}$$
  $y = \frac{\sqrt{x^2 - 16}}{x}$   $y = \frac{\sqrt{x^2 - 16}}{x}$ 

(ii)  $y = \int_{3}^{e^{1-x}} \left(\frac{t-2}{t^2-1}\right) dt$   $\left(\frac{e^{1-x}-2}{e^{2-2x}-1}\right) \cdot e^{1-x}$  (-1)

(b) (i) determine  $\frac{d}{dx} \left( 8x e^{4x} \right)$  8 x . 4 e 4 x 8 e

(ii) hence or otherwise, determine  $\int 32xe^{4x} dx$ 

$$\int \frac{d}{dx} \left( 8x e^{4x} \right) dx = \int 32x e^{4x} + \int 8e^{4x} dx$$

$$\therefore \int 32x e^{4x} dx = 8x e^{4x} - 2e^{4x} + c$$

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#### Question 8 (6 marks)

A cubic function f(x) whose derivative f'(x) is given by  $f'(x) = 2x^2 - 5x + 2$ has a local or relative minimum value of 2. Determine the local or relative maximum value. f''(x) = 4x - 5f'(x) = 0  $2x^2 - 5x + 2 = 0$  $\bar{u}$  (2x-1)(x-2) = 0os 2=2 ·· wax i, f(2) produces the min value of 2 2×13 - 5×12 + 2×1 + 2 24

#### END OF SECTION 1

#### Year 12 3 C/D MAT Semester 2 Examination

# 3 × SI-1 + 05 > W 7 3 3 × SI-1 - 05 50 and standard deviation 10. mean of any sample of size 25 taken from a population of mean (c) a 75% confidence interval (correct to one decimal place) for the $(\xi I.I > z \mid \xi I.I -> z)q$ (d) $(\delta l.l > z > \delta l.l -) Q \qquad (s)$ Use this information to determine: No $\delta SI.0 = (\delta I.I < z)^{A}$ that dous si $\delta I.I$ to evon lamin brahmsta A Question 2 (1, 2, 2 = 5 marks)

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	≥ k(x) = 6 x - 5					
$k(x) = \frac{1}{2}(x(x-1))^{-1} + 1$						
write down the equation of $\kappa(x)$ in its simplest form.						
The function $k(x)$ is a transformation of $h(x)$ consisting of a horizontal dilation of factor 2 followed by a vertical translation of 1 unit						
otaozmod o	(d) The function $h(x)$ is a transformation of $h(x)$ consisting of					
. h = K	$\xi - \frac{1}{2} \chi = (\chi) \hat{\xi}$					
	(2n-4)-1 = (n)!					
	x-1=(x-h)).					
"						
	$x-I = (x) \log \Omega $ (iii)					
b > 6 = 0 : 6						
	µ ≥ x : √					
	(ii) the domain and range of $\int og(x)$					
	27-91					
***************************************	(z <sub>1</sub> - <sub>2</sub> z <sub>1</sub> -+) =					
	$(x) \otimes o f$ (i)					
etermine:						
	(a) Functions f, g, h are defined:					
Question 7 (1, 3, 3, 2 = 9 marks)						
7.0=1 10=5 1.0=0 0.						
	(					
Ć						
5-0	= 3+8					
6.0	= 35+9 (= 2,1=3,0+35+9 my+					
	(b) Solve for p, q and r [ [ ]					
	etermine:    U =					

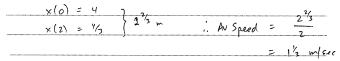
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#### Question 3 (2, 3 = 5 marks)

A particle moves in a straight line so that its distance from a fixed point O is given by  $x = \frac{4}{t+1}$  t>0  $\rightarrow$  (Vel is new term) where x is the distance in metres at time t seconds.

(a) What is the average speed for the first two seconds?



(b) When does the particle reach a speed of  $\frac{1}{4}$  m/sec  $\overset{\circ}{\times} = \frac{-\frac{4}{(t+1)}z}{(t+1)}z \qquad \therefore \text{ Speed} = \frac{4}{(t+1)}z$   $|\overset{\circ}{\times}| = \overset{\circ}{\vee} \Rightarrow \qquad \overset{\circ}{\vee} = 3 \text{ sec}$ 

#### Question 4 (2, 2 = 4 marks)

The first stage of the 2013 AFL Training Camp for elite 18 year old footballers consists of three sets of skills testing A, B and C. From previous experience, the probabilities of success in skills A is 0.4, skills B is 0.6 and skills C is 0.75.

(a) For the top 50 18 year olds who attend the Training Camp, how many would be expected to succeed in all three skills tests?

P(ANB NC) = 
$$\frac{2}{5} \times \frac{3}{5} \times \frac{3}{4} = \frac{9}{50}$$
  
.: Expect 9 to succeed in all 3 skills

To be accepted into the second stage of the Training Program, a trainee must pass Test A and at least one of the other two tests.

(b) What is the probability that a person is accepted into the second stage?

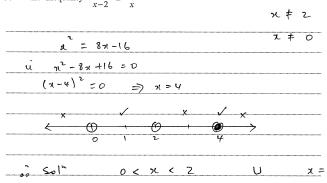
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#### Question 5 (5 marks)

check:

Solve the inequality  $\frac{x}{x-2} \le \frac{8}{x}$ 



#### Question 6 (3, 3 = 6 marks)

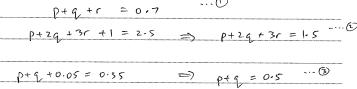
The probability distribution and cumulative probability distribution for a discrete random variable X are shown in the tables below:

x	0	1	2	3	4
P(X=x)	0.05	р	q	r	0.25

x	0	1	2	3	4
$P(X \le x)$	0.05		0.55		1

and it is known that the expected value of the random variable is 2.5.

(a) Form three equations from the given information



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