Casimir Catholic College

YEAR 11

2012 PRELIMINARY ASSESSMENT TASK 1

Mathematics

Section One
Multiple Choice
Total marks (4)

Section Two
Total marks (44)
Answer questions 5-8

NAME:_____

TEACHER:_____

General Instructions

- Working Time – 50 mins
- Write using blue or black pen
- Board-approved calculators may be used
- Start each question in a new booklet
- All necessary working should be shown in every question
- All diagrams are not to scale unless otherwise stated

Section One
Multiple Choice

1. If $|x|>1$ then

   (A) $-1>x>1$ (B) $-1<x<1$ (C) $x>1, x<-1$ (D) $x=\pm 1$

2. $\dfrac{1}{4\sqrt{2x-1}}$ is the same as

   (A) $(2x-1)^{\frac{1}{2}}$ (B) $\dfrac{(2x-1)^{\frac{1}{2}}}{4}$ (C) $4(2x-1)^{-\frac{1}{2}}$ (D) $\dfrac{(2x-1)^{-\frac{1}{2}}}{4}$

3. Expand and simplify $(2\sqrt{3}-4)^2$

   (A) $28-16\sqrt{3}$ (B) $52-8\sqrt{3}$ (C) $4\sqrt{3}-16$ (D) 28

4. The solution to $y^2-8=0$ is

   (A) $y=\pm 4$ (B) $y=8$ (C) $y=\pm 2\sqrt{2}$ (D) $y=1$

Section Two
Question Five **(Start a new booklet)**

(a) Evaluate $\frac{-(3+7\times 3)}{\sqrt[3]{\pi-3.5^2}}$ correct to three significant figures. **1**

(b) Solve

(i) $\frac{x}{2}-\frac{x-1}{3}=5$ **2**

(ii) $4^{3x}=8$ **2**

(c) The cost of an iPod is \$291.50 including 10% GST. **2**
Find the price of the iPod without GST.

(d) Write without a fractional or negative index: $(5-3x)^{-\frac{2}{3}}$ **2**

(e) Write $0.000\,000\,155\,1$ in scientific notation correct to 4 significant figures. **1**

(f) Evaluate $|-3|+|-2|^2-|10|$ **1**

Question Six **(Start a new booklet)**

(a) Simplify the following:

(i) $(2x^3)^3$ **1**

(ii) $\frac{x^4(6y)^2}{4x^3y^6}$ **2**

(iii) $\frac{2-2a}{a-1}$ **2**

(b) Find the value of m and n in the equation $\frac{\sqrt{5}}{\sqrt{5}-2} = m+n\sqrt{5}$. **2**

(c) Solve $|x-4|\leq 8$ and graph the solution on a number line. **2**

(d) Simplify

(i) $\sqrt{50}-\sqrt{32}$ **1**

(ii) $\left(\sqrt{\frac{3}{8}}\right)^2$ **1**

Question Seven **(Start a new booklet)**

(a) Express $0.5\dot{1}$ as a fraction in its simplest form. **2**

(b) Factorise the following:

(i) $8a^3 - 1$ **2**

(ii) $8a^2 - 8$ **2**

(iii) $8a - 8 - ba + b$ **2**

(iv) $8a^2 - 14a + 3$ **2**

(c) Write as a single fraction: $x - y + \dfrac{1}{x+y}$ **1**

Question Eight **(Start a new booklet)**

(a) Solve

(i) $5x - 12 = 13$ **1**

(ii) $7 - \dfrac{x}{3} = 3$ **1**

(iii) $y^{\frac{1}{4}} + 3 = 5$ **2**

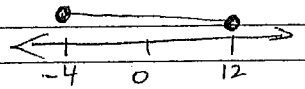
(iv) $|h+2| = 5h - 3$ **3**

(v) $(c+3)(c-1) = 32$ **2**

(b) Given the equation $y = 3\sqrt{x^2 - 5}$, find the value of x when $y = 6$. **2**

2012 YEAR 11 MATHS 2U TASK 1

Qn	Solution	Marks
M.C.	1. $x > 1$ or $-x > 1$, $x < -1$ ∴ (C)	1
	2. (D)	1
	3. (A)	1
	4. (C)	1
Q5	a) $11.4920 = 11.5$ (3 sig figs)	1
	b) i) $\frac{x}{2} - \frac{x-1}{3} = 5 \Rightarrow \frac{3x-2(x-1)}{6} = 5$	1
	∴ $3x - 2x + 2 = 30$	
	$x = 28$	1
	ii) $4^{3x} = 8$	
	$(2^2)^{3x} = 2^3$	1
	$2^{6x} = 2^3$ ∴ $6x = 3$	
	$x = \frac{1}{2}$	1
	c) \$291.50 ≡ 110%	
	2.65 ≡ 1%	
	\$265 ≡ 100%	2
	d) $(5-3x)^{-\frac{2}{3}} = \frac{1}{\sqrt[3]{(5-3x)^2}}$	2
	e) $0.000\,000\,1551 = 1.551 \times 10^{-7}$	1
	f) $\lvert -3 \rvert + \lvert -2 \rvert^2 - \lvert 10 \rvert$	
	$3 + 4 - 10 = -3$	1

Qn	Solution	Marks
Q6		
a)	i) $(2x^3)^3 = 8x^9$	1
	ii) $\frac{x^4(6y)^2}{4x^3y^6} = \frac{36x^4y^2}{4x^3y^6}$	1
	$= \frac{9x}{y^4}$	1
	iii) $\frac{2-2a}{a-1} = \frac{2(1-a)}{a-1}$	1
	$= \frac{-2(a-1)}{a-1} = -2$	1
(b)	$\frac{\sqrt{5}}{\sqrt{5}-2} \times \frac{\sqrt{5}+2}{\sqrt{5}+2}$	1
	$\frac{5+2\sqrt{5}}{5-4} = 5+2\sqrt{5}$ ∴ $m = 5$, $n = +2$	1
(c)	$\lvert x-4 \rvert \leq 8$	
	$x - 4 \leq 8$ or $-(x-4) \leq 8$	
	$x \leq 12$ $\quad -x + 4 \leq 8$	
	$-x \leq 4$	
	$x \geq -4$	1
		
(d)	i) $\sqrt{50} - \sqrt{32} = 5\sqrt{2} - 4\sqrt{2}$	
	$= \sqrt{2}$	1
	ii) $\left(\sqrt{\frac{3}{8}}\right)^2 = \frac{3}{8}$	1

Qn	Solution	Marks
Q7		
a)	$0.5\dot{1}$ let $x = 0.5111\ldots$	
	$10x = 5.111\ldots$ —①	
	$100x = 51.111\ldots$ —②	1
	∴ ② − ①	
	$90x = 46$	
	$x = \frac{46}{90} = \frac{23}{45}$	1
b)	i) $8a^3 - 1$	
	$= (2a)^3 - 1$	1
	$= (2a-1)(4a^2+2a+1)$	1
	ii) $8a^2 - 8$	
	$= 8(a^2-1)$	1
	$= 8(a-1)(a+1)$	1
	iii) $8a - 8 - ba + b$	
	$8(a-1) - b(a-1)$	1
	$(a-1)(8-b)$	1
	iv) $8a^2 - 14a + 3$	
	$= (4a-1)(2a-3)$	2
c)	$\frac{(x-y)}{1} + \frac{1}{(x+y)}$	
	$= \frac{(x-y)(x+y)+1}{x+y}$	
	$= \frac{x^2-y^2+1}{x+y}$ either.	1

Qn	Solution	Marks
Q8		
a)	i) $5x - 12 = 13$	
	$5x = 25$	
	$x = 5$	1
	ii) $7 - \frac{x}{3} = 3$	
	$-\frac{x}{3} = -4$	
	$x = 12$	1
	iii) $x^{1/4} + 3 = 5$	
	$x^{1/4} = 2$	1
	$(x^{1/4})^4 = 2^4$ ∴ $x = 16$	1
	iv) $\lvert h+2 \rvert = 5h - 3$	
	$h+2 = 5h-3$ or $-(h+2) = 5h-3$	
	$-4h = -5$ $-h-2 = 5h-3$	
	$h = 5/4$ $-6h = -1$	
	$h = 1/6$	2
	After checking no sol^n	
	Only sol^n is $h = 5/4$	1
	v) $(c+3)(c-1) = 32$	
	$c^2 - c + 3c - 3 = 32$	
	$c^2 + 2c - 35 = 0$	1
	$(c+7)(c-5) = 0$	
	∴ $c = -7$ or $c = 5$	1
(b)	$6 = 3\sqrt{x^2-5}$	
	$2 = \sqrt{x^2-5}$	
	$4 = x^2 - 5$	1
	$x^2 = 9$	
	∴ $x = 3$ or -3	1