King Fahd University of Petroleum and Minerals
Dammam Community College

MATH 011
Class Test 1

CODE A

Term 162
March 6, 2017

Name: Marking scheme # _____ **Sec #** xy.

This test consists of 8 questions.

Time allowed. 60 minutes.

You must show all necessary steps of your solution.

Calculators are not allowed.

This test worth 8% of the total marks allocated to this course.

Question	Points
Q#1	/4
Q#2	/4
Q#3	/4
Q#4	/4
Q#5	/4
Q#6	/4
Q#7	/4
Q#8	/4
Total points =	/32

Question 1: Factorize the given polynomial $8 + (2y - 1)^3$.

Let $u = 2y - 1$

$8 + (2y-1)^3 = 2^3 + u^3 = (2+u)(4 - 2u + u^2)$ .. 2 pts

1 mark ..... $= (2 + 2y - 1)(4 - 2(2y-1) + (2y-1)^2)$

$= (2y+1)(4 - 4y + 2 + 4y^2 - 4y + 1)$

$= (2y+1)(4y^2 - 8y + 7)$ ... 1 mark

Question 2: Let $U = \{x \mid x \text{ is an even natural number less than } 21\}$ be the universal set and $A = \{2,4,6,8,10,12\}$. Find A'.

$U = \{2, 4, 6, 8, 10, 12, 14, 16, 18, 20\}$ ... 2 marks

$A' = \{14, 16, 18, 20\}$ ... 2 marks

Question 3: Let $\frac{2y^3+y^2-10y+3}{y-2} = my^2 + 5y + \frac{n}{y-2}$,

Perform the division and find $m + n$.

$$
\begin{array}{r|l}
 & 2y^2+5y \\
\hline
y-2 & 2y^3+y^2-10y+3 \\
 & \mp 2y^3 \pm 4y^2 \\
\hline
 & 5y^2-10y \\
 & \mp 5y^2 \pm 10y \\
\hline
 & 3 \leftarrow \text{Remainder}
\end{array}
$$

1 mark

1 mark

$$\frac{2y^3+y^2-10y+3}{y-2} = 2y^2+5y+\frac{3}{y-2} = my^2+5y+\frac{n}{y-2}$$

$m = 2$, $n = 3$, $m+n = 2+3 = 5$ 1 mark

1 mark

Question 4: Let the set

$$A = \left\{-6, -\frac{\pi}{4}, 2.\overline{3}, -\sqrt{3}, -1.2, 0, \frac{1}{4}, \frac{\sqrt{3}}{\sqrt{12}}, 1, 3, 42.0505505550\ldots\right\}$$

List all the elements of A that are rational numbers.

The elements of A, which are rational numbers are, $-6, 2.\overline{3}, -1.2, 0, \frac{1}{4}, \frac{\sqrt{3}}{\sqrt{12}}, 1, 3$

(0.5) mark for each number

Question 5: Simplify the given rational expression,

$$\frac{5z-20}{z-5} \div \frac{z^2-16}{z^2-z-20}$$

$$\frac{5z-20}{z-5} \div \frac{z^2-16}{z^2-z-20} = \frac{5z-20}{z-5} \cdot \frac{z^2-z-20}{z^2-16}$$ 1mark

$$= \frac{5(z-4)}{(z-5)} \cdot \frac{(z-5)(z+4)}{(z-4)(z+4)}$$ 1mark 1mark

$$= 5$$ 1mark

Question 6: Let $U = \{-2, -1, 0, 1, 2, 3, 4, 5, 6, 7\}$ be the universal set. If $E = \{-2, -1, 0, 1, 3, 5, 7\}$, $F = \{x | x \text{ is an integer}, -1 < x < 5\}$ and $H = \{1, 3, 5, 7\}$. Find $(E \cap F) \cup H$.

$E = \{-2, -1, 0, 1, 3, 5, 7\}$

$F = \{0, 1, 2, 3, 4\}$ ------ 1mark

$E \cap F = \{0, 1, 3\}$ ------ 1mark

$(E \cap F) \cup H = \{0, 1, 3\} \cup \{1, 3, 5, 7\}$ ------ 1mark

$= \{0, 1, 3, 5, 7\}$ ------ 1mark

Question 7: Find the value of $|4-\sqrt{15}|-|5-\sqrt{15}|$.

1.5 .... $|4-\sqrt{15}| = 4-\sqrt{15}$, $(4-\sqrt{15}>0)$

1.5 ... $|5-\sqrt{15}| = 5-\sqrt{15}$, $(5-\sqrt{15}>0)$

$|4-\sqrt{15}|-|5-\sqrt{15}| = 4-\sqrt{15}-(5-\sqrt{15})$ 0.5

$= 4-\cancel{\sqrt{15}}-5+\cancel{\sqrt{15}}$

$= -1$ ... 0.5

Question 8: Simplify the following expression,

$$\frac{2}{x^2+5x-6}-\frac{2}{x^2+7x+6}.$$

$= \dfrac{2}{(x+6)(x-1)} - \dfrac{2}{(x+6)(x+1)}$ 1

1 ... Lcd $((x+6)(x-1),\ (x+6)(x+1)) = (x+6)(x+1)(x-1)$

$= \dfrac{2(x+1)}{(x+6)(x+1)(x-1)} - \dfrac{2(x-1)}{(x+6)(x+1)(x-1)}$ . . 1

$= \dfrac{2x-2-2(x-1)}{(x+6)(x+1)(x-1)}$ .. 0.5

$= \dfrac{4}{(x+6)(x+1)(x-1)}$ ... 0.5