**F.3 Mathematics – Supplementary Worksheet for NCM 3A Chapter 2**

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

**Class: 3\_\_\_\_\_\_ ( )**

**Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Level 1**

1. Without using a calculator, find the values of each of the following expressions and give the answers in integers or fractions.

(a) 5–3 ÷ 5–5 × 50

(b) (2–3 ÷ 20)–2

(c) 

(9 marks)

2. Without using a calculator, find the values of each of the following expressions and give the answers in integers or fractions.

(a) 4–3 ÷ 2–5

(b) 

(c) 

(12 marks)

3. Simplify the following expressions and express the answers with positive indices. (*All letters in the expressions represent non-zero numbers.*)

(a) *a*–7 × *a*3 ÷ *a*–5

(b) 

(c) (*m*–3 *n*2)–1

(9 marks)

4. Simplify the following expressions and express the answers with positive indices. (*All letters in the expressions represent non-zero numbers.*)

(a) (–3*a*–2 *b*)–3

(b) (2–2 *x*4 *y*–3)–1

(c) 

(12 marks)

5. Use a calculator to evaluate the following expressions and express the answers in scientific notation.

(a) 7.4 × 108 – 9.1 × 106

(b) (5.6 × 10–8) × (1.5 × 105)

(c) (2.5 × 103) ÷ (3.2 × 10–4)

(12 marks)

6. If 72.4 g of a chemical *K* contains 8 × 1035 molecules, find the weight of each molecule of the chemical *K*. (*Give the answer in scientific notation.*)

(10 marks)

7. The speed of sound is 332 m/s. If a train takes 5 hours to cover a distance equivalent to the distance that sound travels in half an hour, find the speed of train in km/h. (*Give the answer correct to 2 significant figures, and express the answer in scientific notation.*)

(12 marks)

8. (a) Write the following binary numbers in the expanded form.

(i) 10012

(ii) 11001112

(b) Write the following hexadecimal numbers in the expanded form.

(i) 4B16

(ii) C0116

(12 marks)

9. (a) Convert 1510 into a binary number.

(b) Convert 17210 into a hexadecimal number.

(12 marks)

**Level 2**

1. Without using a calculator, find the values of each of the following expressions and give the answers in integers or fractions.

(a) 16–1 × (4–2)–1 ÷ (2–5)0

(b) 3–4 × 123 ÷ (–36)–2

(c) 53 – (–5)–2 × (20–1)–2

(12 marks)

2. Simplify the following expressions and express the answers with positive indices. (*All letters in the expressions represent non-zero numbers.*)

(a) 

(b) 

(c) (*x*5*y*–2)–3(*x*–2*y*)–2

(12 marks)

3. Evaluate each of the following expressions and express the answer in scientific notation.

(a) 

(b) 

(12 marks)

4. It is given that the area of an island is 2.75 × 105 acres. Find the area of the island in cm2, correct to 3 significant figures. (Take 1 acre = 4.05 × 103 m2.)

(10 marks)

5. The volume of water in a reservoir is about 1.35 km3.

(a) Express the volume of water in m3 and in scientific notation.

(b) If 2.7 × 106 L of water is drained from the reservoir every day, how many days will it take to empty the reservoir?

(12 marks)

6. A spacecraft started her flight from planet *A* to planet *B* at a speed of 1.6 × 104 m/s. If the distance between the two planets is  light year, how long, in years, will it take to reach planet *B*? Take 1 light year = 9.5 × 1012 km and1 year = 365 days.(*Give the answer correct to 3 significant figures.*)

(20 marks)

7. (a) Find the smallest 6-digit binary number which contains three 0 digits.

(b) Find the largest 6-digit binary number which contains three 0 digits.

(c) By converting the two binary numbers in (a) and (b) into decimal numbers, find their difference.

(10 marks)

8. (a) Convert 7C16 into a binary number.

(b) Convert 111001012 into a hexadecimal number.

(12 marks)