CHUNG CHENG HIGH SCHOOL (MAIN)
Sec 3 Additional Mathematics 2024
Weighted Assessment 3

Mathematical Modelling of COVID-19 Transmission in Singapore
Individual Component

20

Name: _____ ( ) **Group Number:** _____

Class: _____

Submission Deadline: 26th July 2024, Term 3 Week 5

1 State the equation of the exponential function using values of a and b that the team identified in Task 4 to model the COVID-19 transmission in Singapore.

[1]

2 Give one limitation of using the exponential function to estimate the number of COVID-19 cases in Singapore. [1]

3 Using the equation in **Question 1**, find the number of new COVID-19 cases when $t = 14$. [1]

4 Using the equation in **Question 1**, find the value of t when there are 2000 number of new COVID-19 cases. [2]

5 What is the date when Singapore implemented the Lock-down measure? Identify the week number that the date corresponds. [2]

6 Using your chart in google sheet, explain why the Lock-down measure was implemented at that week identified in **Question 5**. [1]

7 The actual number of new COVID-19 cases in **week 15** is 4855 respectively.

Find the percentage difference between the actual COVID-19 cases and model COVID-19 cases for week 14 and week 15 respectively.

Explain why there could be a large discrepancy between the percentage differences. [3]

Using Linear Law to find the unknown parameters in the Exponential Growth Model

Using selected values from the table your team has created in Microsoft Excel in Task 1, you are tasked to draw a straight-line graph and use it to find the unknown constants a and b.

8 Complete the table below. You can refer to the table your team has created using Microsoft excel in Task 1.

t	5	9	13	14
$\ln y$				

[1]

9 Plot the graph of $\ln y$ against t on the grid paper provided on page 4. [2]

10 Using the graph plotted in **Question 9**, find the values of the constants a and b. [4]

11 Using the graph in **Question 9**, find the number of new COVID-19 cases when $t = 11$.

[1]

12 Is the graph plotted in **Question 9** able to provide a good estimate of the number of COVID-19 cases for week 15? Explain your answer. [1]