**Hwa Chong Institution**
**Integrated Programme**
**Secondary Three Mathematics**

***Name:*** _____ ***(  )*** ***Class:*** _____ ***Date:*** _____

**Term 3 A.Math Class Test (Revision Paper 1)**
**Answer all the questions.**

**Question 1:**

**(a)** Given that $\log_b\left(x^3y\right) = p$ and $\log_b\left(\frac{y}{x^2}\right) = q$, express $\log_b\sqrt{xy}$ in terms of $p$ and $q$.

$\frac{1}{10}(3p + 2q)$ [6]

**(b)** Solve the equation $\log_x 8 + 2\log_2 x = 7$. $x = \sqrt{2}$ [Accept $x = 1.41$] or $x = 8$ [4]

**Question 2:**

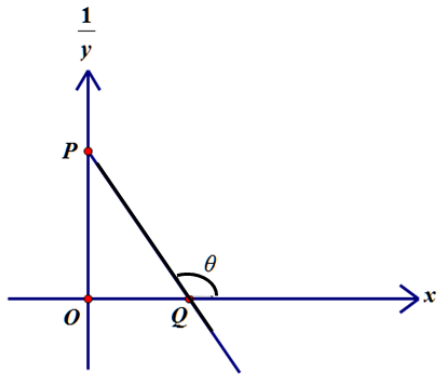
**(i)** Use the substitution $y = 2^x$ to express the equation $2^{3x+1} + 7\left(2^x\right) = 4 - 4^x$ as a cubic equation in $y$. $2y^3 + y^2 + 7y - 4 = 0$ [1]

**(ii)** Show that $y = \frac{1}{2}$ is the only real solution of this equation. [4]

**(iii)** Hence solve the equation $2^{3x+1} + 7\left(2^x\right) = 4 - 4^x$. x=-1 [1]

**Question 3:**

The two variables $x$ and $y$ are related by the equation $2y - 5xy = 1$. The diagram shows part of a straight line graph obtained by plotting $\frac{1}{y}$ against $x$.




Find

(i) the coordinates of $P$ and $Q$, $P(0,2)$ $Q(\frac{2}{5},0)$ [3]

(ii) the value of $\theta$ in degrees. $101.3°$ (to 1 d.p.) [2]

**Question 4:** remainder=27

The expression $ax^3 + x^2 + bx$ has remainder 3 when it is divided by $x+1$. When the expression is divided by $x-2$, the remainder is 6. Find the remainder when the expression is divided by $x-3$. [4]

**Question 5:**

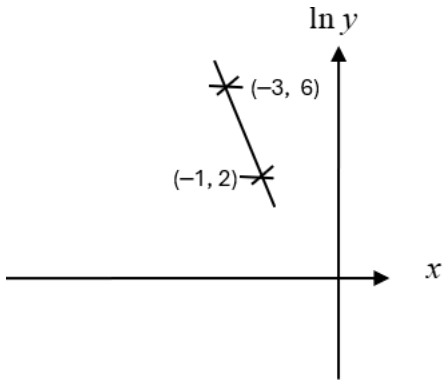
**(i)** Factorise the expression $3x^3 - 8x^2 - 5x + 6$ completely. (x+1)(3x-2)(x-3) [3]

**(ii)** Hence, sketch the graph of $y = 3x^3 - 8x^2 - 5x + 6$, indicate clearly the coordinates of the $x$-intercepts and $y$- intercept. [3]

**Question 6:**

The figure shows part of a straight line graph obtained by plotting values of the variables indicated.

Express $y$ as a function of $x$. $y = e^{-2x}$ [3]




**Question 7:**

Using long division, find the quotient and remainder when $x^5 - 3x^4 + 2x^3 - 2x^2 + 3x + 1$ is divided by $2x^2 + 3$. [3]

Quotient: (1/2)x^3-(3/2)x^2+(1/4)x+5/4

Reminder: (9/4)x-15/4