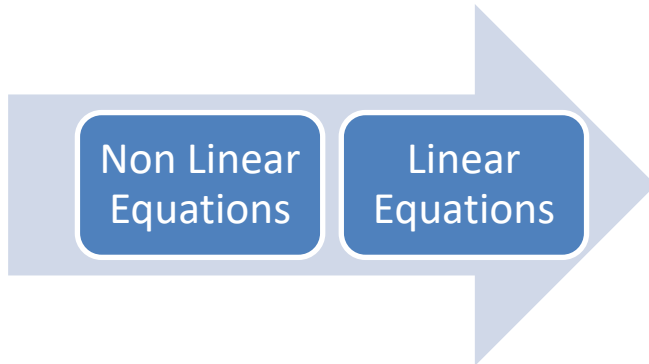


Linear Law

We have learned about linear equation when we were in Form 3 and Form 4. In this chapter, the application of linear equation $Y = mX + C$ will help us to convert non linear equation to linear equation



Change the following non linear equations to linear equations

a) $y = \frac{a}{x} + bx$

b) $y = ax^2 + bx$

c) $y = \frac{x(a+bx)}{x^2}$

d) $y = ab^x$

e) $y = \frac{a}{b}x + x^2$

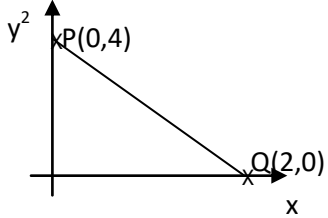
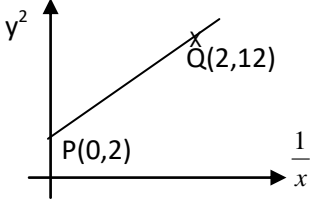
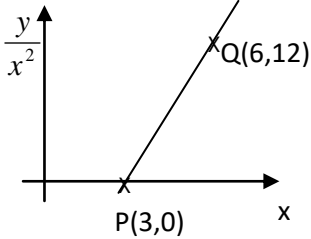
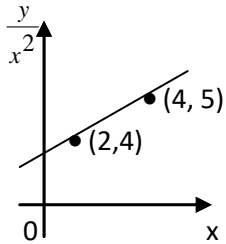
f) $y = \sqrt{ax}$

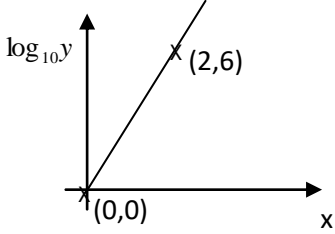
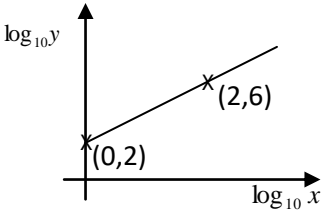
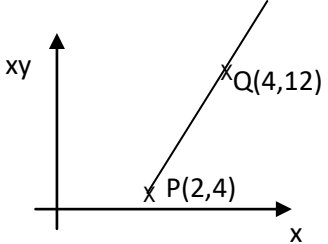
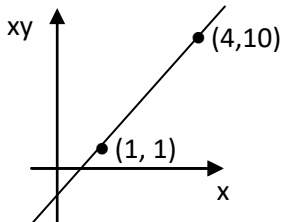
g) $y = \frac{a}{x} + \frac{b}{x^2}$

h) $xy = \frac{a}{x} + bx^2$

i) $\frac{x}{y} = ax^2 + bx$

Non Linear Equation

<p>1</p>	<p>The diagram below shows the line of best fit for the graph of y^2 against x. Determine the non-linear equation connecting y and x.</p>  <p>[$y^2 = -2x + 4$]</p>	<p>2</p>	<p>The diagram below shows the line of best fit for the graph of y^2 against $\frac{1}{x}$. Determine the non-linear equation connecting y and x.</p>  <p>[$y^2 = 5\left(\frac{1}{x}\right) + 2$]</p>
<p>3</p>	<p>The diagram below shows the line of best fit for the graph of $\frac{y}{x^2}$ against x. Determine the non-linear equation connecting y and x.</p>  <p>[$\frac{y}{x^2} = 4x - 12$]</p>	<p>4</p>	<p>The diagram below shows the line of best fit for the graph of $\frac{y}{x^2}$ against x. Determine the non-linear equation connecting y and x.</p>  <p>[$\frac{y}{x^2} = \frac{1}{2}x + 3$]</p>

<p>5</p>	<p>The diagram below shows the line of best fit for the graph of $\log_{10} y$ against x. Determine the non-linear equation connecting y and x.</p>  <p>[$\log_{10} y = 3x$]</p>	<p>6</p> <p>The diagram below shows the line of best fit for the graph of $\log_{10} y$ against $\log_{10} x$. Determine the non-linear equation connecting y and x.</p>  <p>[$\log_{10} y = 2 \log_{10} x + 2$]</p>
<p>7</p>	<p>The diagram below shows the line of best fit for the graph of xy against x. Determine the relation between y and x.</p>  <p>[$y = 4 - \frac{4}{x}$]</p>	<p>8</p> <p>The diagram below shows the straight line graph of xy against x. Express y in terms of x.</p>  <p>[$y = 3 - \frac{2}{x}$]</p>

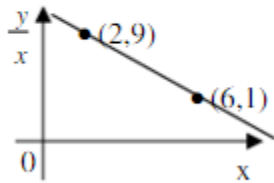
SPM Questions

Part I

Question 1

SPM 2003 Paper 1 Q10

x and y are related by the equation $y = px^2 + qx$ where p and q are constants. A straight line is obtained by plotting $\frac{y}{x}$ against x , as shown in the diagram below.



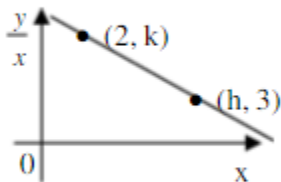
Calculate the values of p and q . [4 marks]

Question 2

SPM 2004 Paper 1 Q13

Diagram below shows a straight line graph of

$\frac{y}{x}$ against x



Given that $y = 6x - x^2$, calculate the value of k and h [3 marks]

Part II

1. Use graph paper to answer this question.

The table below records the values of an experiment for two variables x and y which are related by

$$y = px^2 + \frac{q}{x} \text{ where } p \text{ and } q \text{ are constants.}$$

x	0.8	1	1.3	1.4	1.5	1.7
y	108.75	79	45.38	36.5	26.67	8.19

(a) Plot xy against x^3 using scale 2 cm represents 1 unit in x -axis and 2 cm represents 10 units for y -axis.

Hence, draw the line of best fit

[5marks]

(b) From the graph, estimate the value of

(i) p and q

(ii) x when $y = \frac{45}{x}$

[5marks]

[Answer: $p = -16.67$, $q = 95$, $x = 1.458$]

2. Use graph paper to answer this question.

The table below records the values of an experiment for two variables x and y which are related by $\frac{y}{x} = \frac{p}{x} + kx$

where p and k are constants.

x	3	5	6	7	8	9
y	4.7	4.0	3.6	3.0	2.5	1.8

(a) Plot the graph y against x^2

[4 marks]

(b) use the graph to estimate the values of

(i) p

(ii) k .

(iii) x which satisfy the simultaneous equation $\frac{y}{x} = \frac{p}{x} + kx$ and $y = 2$

[6 marks]

[answer: $p = 5$, $k = -0.04$, $x = 8.60 - 8.75$]