

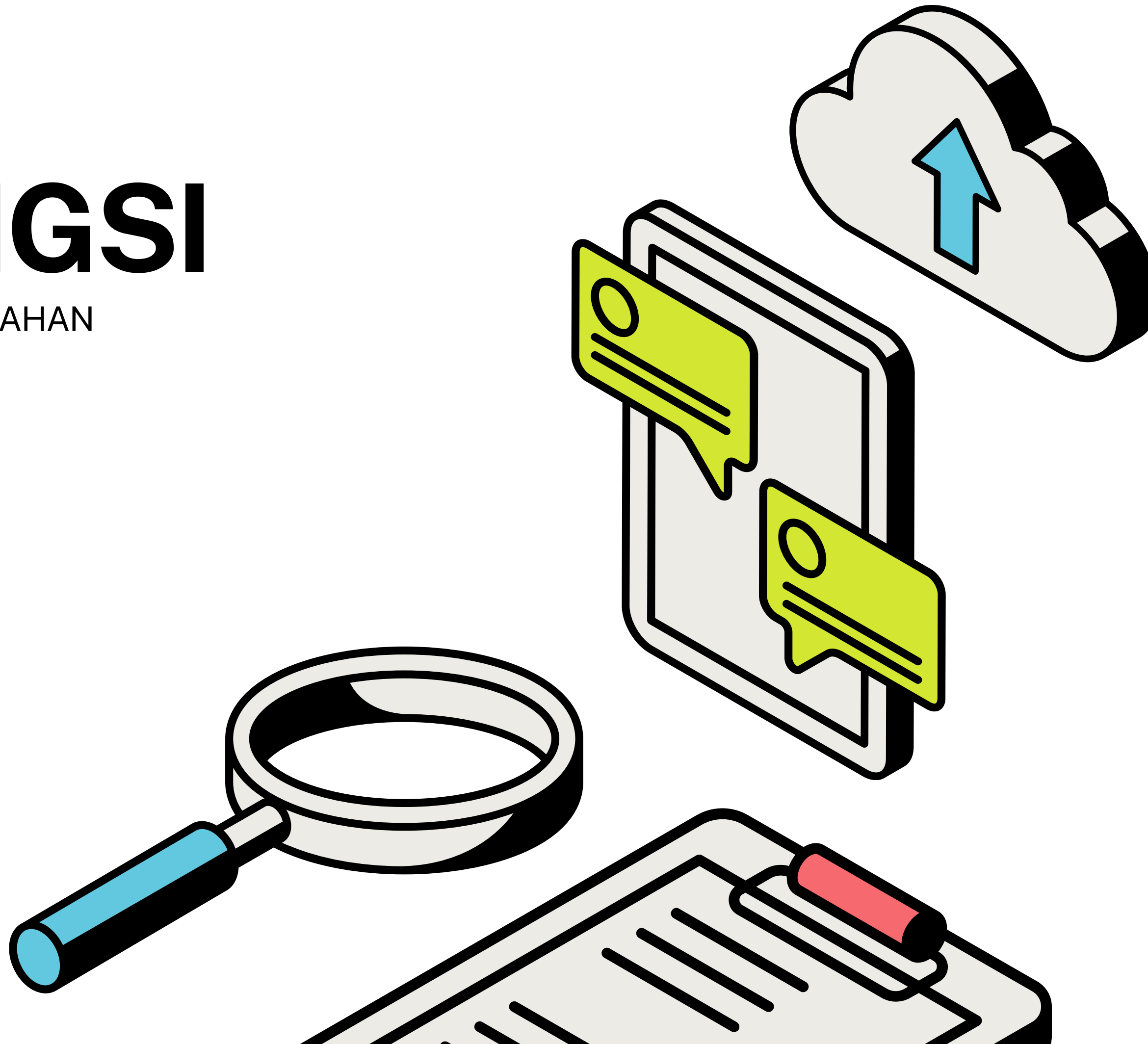
TINGKATAN 4

BAB 1: FUNGSI

KOMPILASI SOALAN MATEMATIK TAMBAHAN
PERCUBAAN SPM 2023

SKEMA PEMARKAHAN

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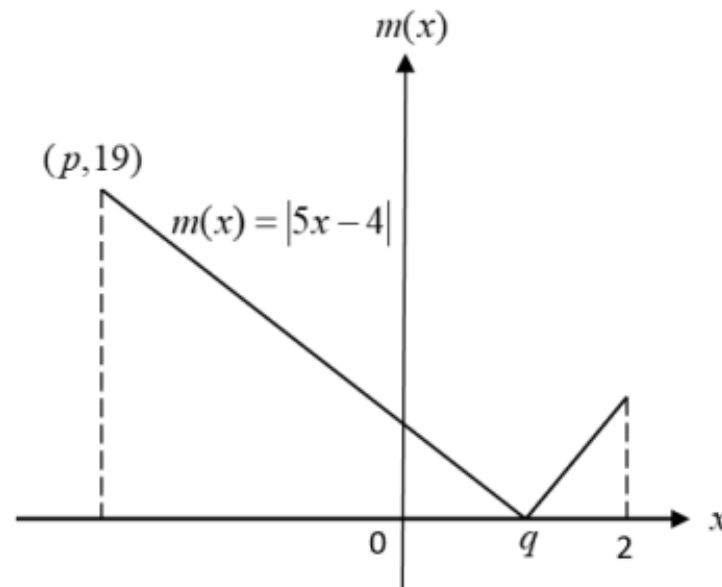
KELANTAN (K1)

FUNGSI

MELAKA (K1)

2. Rajah 2 menunjukkan graf fungsi $m(x) = |5x - 4|$ bagi $p \leq x \leq 2$.

Diagram 2 shows the graph function $m(x) = |5x - 4|$ where $p \leq x \leq 2$.



Rajah 2
Diagram 2

(a) Cari nilai bagi p dan q . [3 markah]

Find the values of p and of q . [3 marks]

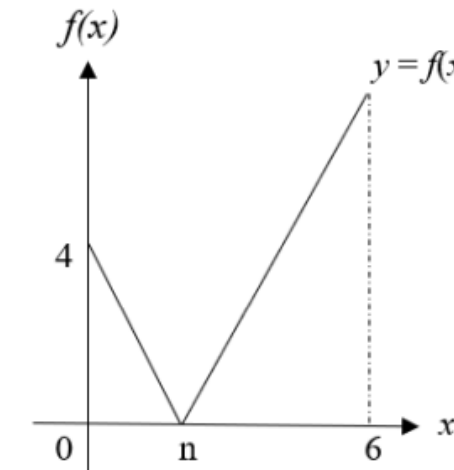
(b) Seterusnya, nyatakan domain apabila julatnya melebihi 4. [2 markah]

Hence, state the domain when the range is greater than 4. [2 marks]

2	$5p - 4 = -19$ atau setara ATAU $ 5x - 4 = 0$	K1
(a)	$p = -3$	N1
	$q = \frac{4}{5}$	N1
2	$-(5x - 4) = 4$ atau setara	K1
(b)	$-3 \leq x \leq 0$	N1

11. Rajah 8 menunjukkan graf bagi fungsi $f(x) = |m + 2x|$ untuk domain $0 \leq x \leq 6$.

Diagram 8 shows the graph of the function $f(x) = |m + 2x|$ for the domain $0 \leq x \leq 6$.



Rajah 8
Diagram 8

Cari
Find

(a) nilai m dan n . [3 markah]
the value of m and of n . [3 marks]

(b) julat bagi fungsi itu. [1 markah]
the range of the function. [1 mark]

(c) nilai-nilai x jika $f(x) \geq 2$. [2 markah]
the values of x if $f(x) \geq 2$. [2 marks]

11. (a)	$m = -4$	1
	$ -4 + 2n = 0$	1
	$n = 2$	1
(b)	$0 \leq f(x) \leq 8$	1
(c)	$-4 + 2x \geq 2$ dan $-4 + 2x \leq -2$	1
	$x \geq 3$ dan $x \leq 1$	1

N9 (K1)

FUNGSI

PAHANG (K1)

2 Diberi $f(x) = \frac{\sqrt{x+9}}{3}, x \geq p$. Cari nilai bagi

Given $f(x) = \frac{\sqrt{x+9}}{3}, x \geq p$. Find the value of

(a) p ,

[1 markah]

[1 mark]

(b) m , jika $|f(m)| = \frac{1}{2}$.

[2 markah]

m , if $|f(m)| = \frac{1}{2}$.

[2 marks]

2	(a)	-9	N1
	(b)	$\frac{\sqrt{m+9}}{3} = \pm \frac{1}{2}$	K1
		$-\frac{27}{4} // -6.75$	N1

12 Suatu fungsi f ditakrifkan oleh $f : x \rightarrow |x-3|$ untuk domain $-2 \leq x \leq 8$.

A function f is defined by $f : x \rightarrow |x-3|$ for the domain $-2 \leq x \leq 8$.

(a) Lakarkan graf f dan nyatakan julat yang sepadan.

Sketch the graph of f and state the corresponding range.

[3 markah]

[3 marks]

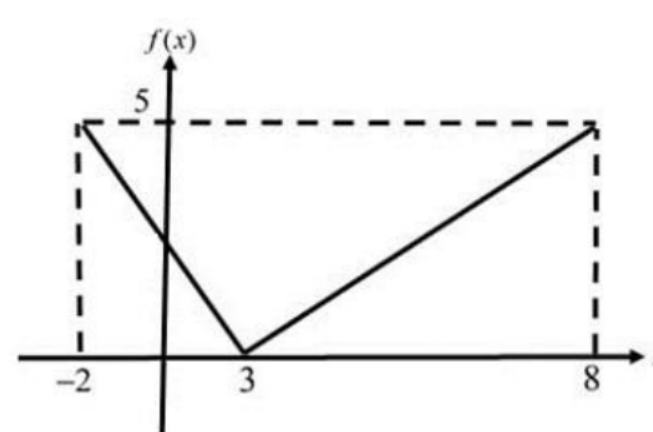
(b) Seterusnya, cari nilai-nilai x jika $fg(x) = x$, diberi bahawa

$$g(x) = 2x - 6.$$

Hence, find the values of x if $fg(x) = x$, given that $g(x) = 2x - 6$.

[3 markah]

[3 marks]

12	(a)		
		Bentuk V	1
		Label (3,0), (-2,5), (8,5)	1
		Julat: $0 \leq f(x) \leq 5$	1
	(b)	$fg(x) = 2x-9 $	1
		$2x-9 = x, 2x-9 = -x$	1
		$x = 9, x = 3$	1

N9 (K1)**FUNGSI**

- 11** Harith merupakan seorang agen jualan suatu produk kesihatan dari luar negara. Syarikat itu membayar bonus sebanyak 25% daripada jualan bulanan seorang agen. Diberi $g(x)$ ialah fungsi bonus yang diterima oleh Harith dan x ialah jualan bulanan. Mulai bulan Mei 2022, syarikat menetapkan satu polisi baharu. Jumlah jualan ialah jualan bulanan yang telah ditolak dengan yuran keahlian, iaitu RM380 sebulan. Diberi $f(x)$ ialah fungsi yang mewakili jumlah jualan yang diperoleh bermula bulan Mei 2022.

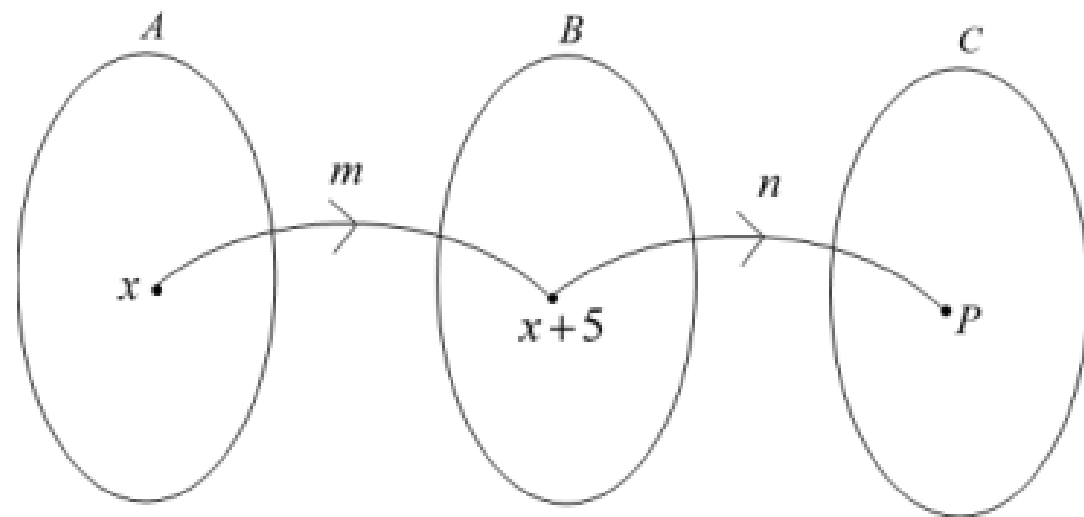
Harith is an agent selling health products from abroad. The company pays 25% of the agent's monthly sales. Given $g(x)$ is the bonus function that Harith will receive and x is the monthly sales. In the beginning of May 2022, the company sets a new policy. The total sales are monthly sales which have been deducted with a membership fee of RM380 per month. Given $f(x)$ is a function that represents the total sales earned starting May 2022.

- (a) Nyatakan fungsi $f(x)$ dan $g(x)$. Seterusnya, tentukan fungsi gubahan yang mewakili bonus bulanan yang diperoleh oleh Harith. [3 markah]
State the function of $f(x)$ and $g(x)$. Hence, determine the composite function that represents monthly bonus received by Harith. [3 marks]
- (b) Harga seunit produk ialah RM373. Harith mesti menerima bonus sekurang-kurangnya RM5500 jika hendak mencapai pangkat yang lebih tinggi. Berapakah kuantiti minimum produk yang perlu dijual untuk mencapai misi ini? [4 markah]
The price of a product is RM373. Harith must receive a bonus of at least RM5500 if he wishes to achieve a higher rank. What is the minimum quantity of product needs to be sold to achieve his mission? [4 marks]

11	(a)	$f(x) = x - 380$	P1
		$g(x) = 0.25x$	P1
		$gf(x) = 0.25(x - 380)$	N1
	(b)	$0.25(x - 380) \geq 5500$	K1
		$22380 \div 373$	K1
		$x \geq 60$	K1
		60	N1

PAHANG (K1)**FUNGSI**

- 2 (a) Rajah 2 menunjukkan fungsi m memetakan set A kepada set B , manakala fungsi n yang diwakili oleh $x^2 - 2$ memetakan set B kepada set C . Diberi P adalah ungkapan dalam sebutan x .
Diagram 2 shows the function of m that maps set A to set B , whereas the function of n which is represented by $x^2 - 2$ maps set B to set C . Given that P is an expression in terms of x .



Rajah 2
Diagram 2

- (i) Cari nilai t sekiranya $m^{-1}(t+2) = m(-2)$.
Find the value of t if $m^{-1}(t+2) = m(-2)$.
- (ii) Nyatakan ungkapan bagi P .
State the expression of P .

2	(a)	(i)	$m^{-1}(x) = x - 5$ atau $m(-2) = 3$	1
			$(t+2) - 5 = 3$	1
			6	1
		(ii)	$nm(x) = (x+5)^2 - 2$	1

[4 marks]

- (b) Diberi bahawa $k(x) = \frac{p}{x-2}$, $x \neq 2$, dengan keadaan p ialah pemalar.

Given that $k(x) = \frac{p}{x-2}$, $x \neq 2$, such that p is a constant.

- (i) Cari $g(x)$ dalam sebutan p , diberi bahawa

$$gk(x) = \frac{5x-8}{x-2}, x \neq 2.$$

Find $g(x)$ in terms of p , given that $gk(x) = \frac{5x-8}{x-2}$, $x \neq 2$.

- (ii) Seterusnya, nyatakan nilai $g(p)$.

Hence, state the value of $g(p)$.

[4 markah]

[4 marks]

(b)	(i)	$\frac{p}{y} + 2 = x$, y boleh sebarang huruf selain x, k, g, p	1
		$g(y) = \frac{5\left(\frac{p}{y} + 2\right) - 8}{\left(\frac{p}{y} + 2\right) - 2}$	1
		$g(x) = \frac{5p+2x}{p}$ atau $g(x) = 5 + \frac{2}{p}x$	1
	(ii)	7	1

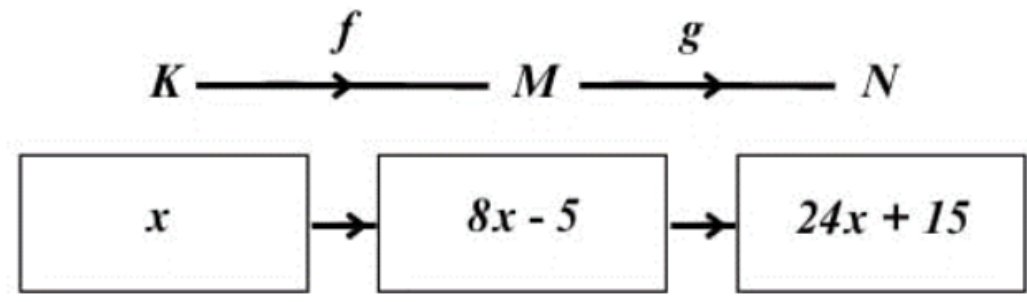
PERLIS (K1)

FUNGSI

SABAH (K1)

1 Rajah 1 di bawah menunjukkan fungsi f yang memetakan set K kepada set M dan fungsi g yang memetakan set M kepada set N .

Diagram 1 shows the function f which maps set K to the set M and the function g which maps set M to set N .



Rajah 1 / Diagram 1

Cari / Find

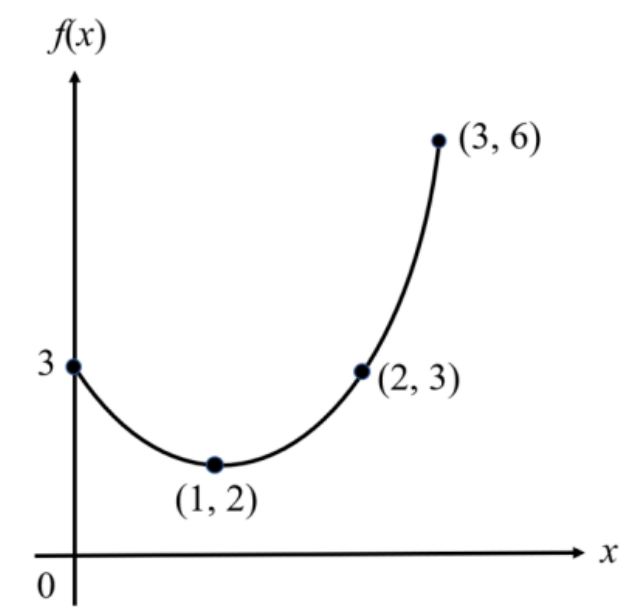
(a) fungsi yang memetakan set M kepada set K , dalam sebutan x .
the function which maps set M to set K , in terms of x . [1 markah / mark]

(b) $g(x)$. [3 markah / marks]

1		
(a)	$f^{-1}(x) = \frac{x+5}{8}$ N1	1
(b)	$g(8x - 5) = 24x + 5$ atau P1 $gf(x) = 24x + 5$ $g(x) = 24 * \left(\frac{x+5}{8}\right) + 15$ K1 $g(x) = 3x + 30$ N1	
		3

1. Rajah 1 menunjukkan suatu fungsi $f(x)$ yang tertakrif dalam domain tertentu.

Diagram 1 shows a function of $f(x)$ defined in a certain domain.



Rajah 1/Diagram 1

a) Nyatakan jenis hubungan fungsi ini.
State the type of relation of this function. [1 markah/mark]

b) Nyatakan domain dan julat bagi fungsi ini.
State the domain and range of this function. [2 markah/marks]

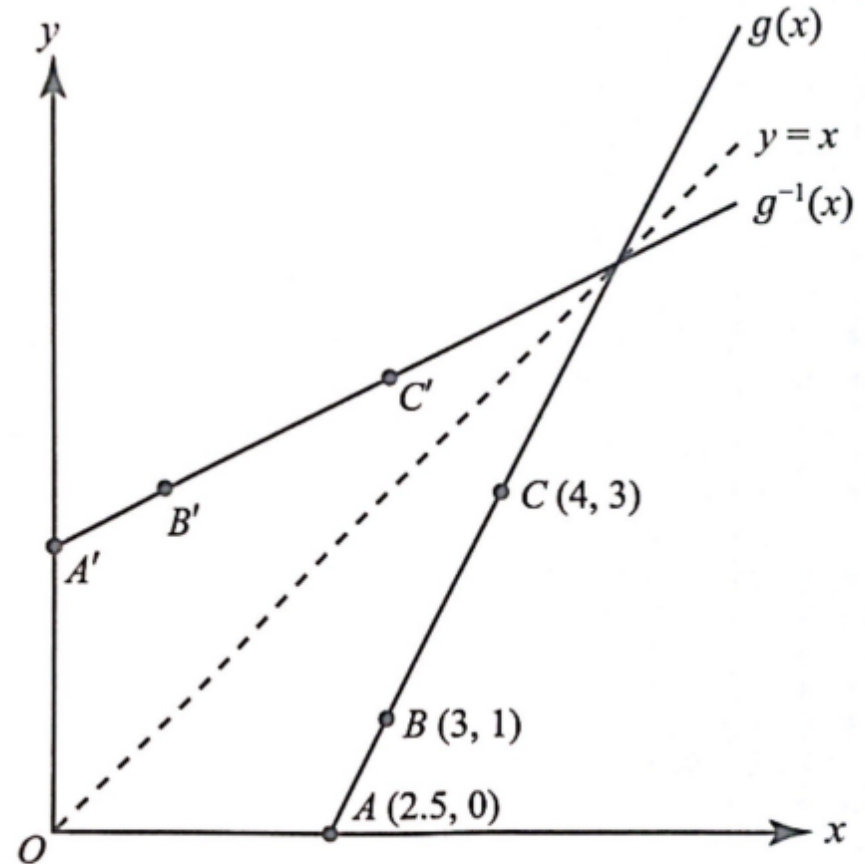
1	a) Banyak kepada satu	N1
	b) $0 \leq x \leq 3$ $2 \leq f(x) \leq 6$	N1 N1

SELANGOR SET 1 (K1)

FUNGSI

1 Rajah 1 menunjukkan graf bagi fungsi linear $y = g(x)$ dan $y = g^{-1}(x)$ ialah pantulan graf itu pada garis $y = x$.

Diagram 1 shows the graph of a linear function $y = g(x)$ and $y = g^{-1}(x)$ is the reflection of the graph in the line $y = x$.



Rajah 1
Diagram 1

(a) Cari koordinat B' , jika koordinatnya yang sepadan terletak pada graf $y = g(x)$.
Find the coordinates of B' , if the corresponding coordinates lies on the graph $y = g(x)$.

(b) Menggunakan tatatanda fungsi, ungkapkan g dalam sebutan x .
Using the function notation, express g in terms of x .

[3 markah]
[3 marks]

1	(a)	(1,3)	N1
	(b)	Guna $y - y_1 = m(x - x_1)$ $g: x \rightarrow 2x - 5$	K1 N1

2 Arif menawarkan perkhidmatan pembungkusan barang. Harga kos bagi setiap bungkusan barang ialah RM4.50 dan harga jualan ialah RM5.30. Secara purata, dia membelanjakan RM120.00 untuk caj pos n bungkusan barang tersebut.

Arif offers parcel packaging services. The cost price per package is RM4.50 and selling price is RM5.30. On average, he spends RM120.00 on the postage charge of n parcels.

(a) Jika f mewakili keuntungan daripada perkhidmatan pembungkusan barang tersebut, ungkapkan f dalam sebutan n .

If f represents the profit of parcel packaging service, express f in terms of n .

(b) Cari nilai bagi n untuk mendapatkan pulangan modal.

Find the value of n to get return capital.

[4 markah]
[4 marks]

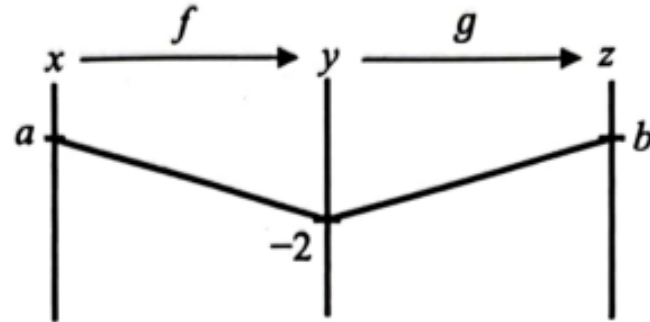
2	(a)	$f(n) = (5.30 - 4.50)n - 120$ $f(n) = 0.8n - 120$	K1 N1
	(b)	$0.8n - 120 = 0$ 150	K1 N1

SELANGOR SET 2 (K1)

FUNGSI

- 15 Rajah 15 menunjukkan fungsi f yang memetakan x kepada y dan fungsi g yang memetakan y kepada z .

Diagram 15 shows function f that maps x onto y and function g that maps y onto z .



Rajah 15
Diagram 15

- (a) (i) Ungkapkan dalam sebutan f dan g bagi fungsi yang memetakan x kepada z .
Express in terms of f and g of the function that maps x onto z .
- (ii) Nyatakan nilai $g^{-1}g(-2)$.
State the value of $g^{-1}g(-2)$.

[2 markah]
[2 marks]

- (b) Diberi bahawa $f^{-1}(x) = \frac{2x+3}{x-2}$, $x \neq 2$ dan $gf(x) = 3x - 6$,

It is given that $f^{-1}(x) = \frac{2x+3}{x-2}$, $x \neq 2$ and $gf(x) = 3x - 6$,

cari

find

- (i) nilai a ,
the value of a ,
- (ii) $g(x)$.

[6 markah]

15	(a)	(i)	$gf(x) = z$	P1
		(ii)	-2	P1
	(b)	(i)	$\frac{2(-2)+3}{(-2)-2} = a$ $a = \frac{1}{4}$	K1 N1
		(ii)	$f^{-1}(x) = \frac{2x+3}{x-2}$ $y = \frac{2x+3}{x-2}$ $y(x-2) = 2x+3$ $x = \frac{2y+3}{y-2}$ $f(x) = \frac{2x+3}{x-2}, x \neq 2$ $g\left(\frac{2x+3}{x-2}\right) = 3x-6$ $g(y) = 3\left(\frac{2y+3}{y-2}\right) - 6$ $g(x) = \frac{21}{x-2}, x \neq 2$	K1 N1 K1 N1

KELANTAN (K2)**FUNGSI**

2. Diberi bahawa $f(x) = px + q$ dan $f^3(x) = 8x + 14$.

Given that $f(x) = px + q$ and $f^3(x) = 8x + 14$.

(a) Cari nilai p dan nilai q .

[3 markah]

Find the values of p and of q .

[3 marks]

(b) Cari $f^{-1}(-6)$.

[2 markah]

Find $f^{-1}(-6)$.

[2 marks]

(c) Ungkapan bagi $f^4(x)$ dan seterusnya tentukan rumus umum $f^n(x)$, di mana n ialah integer positif.

[3 markah]

Express $f^4(x)$ and determine the general formula for $f^n(x)$, where n is a positive integer.

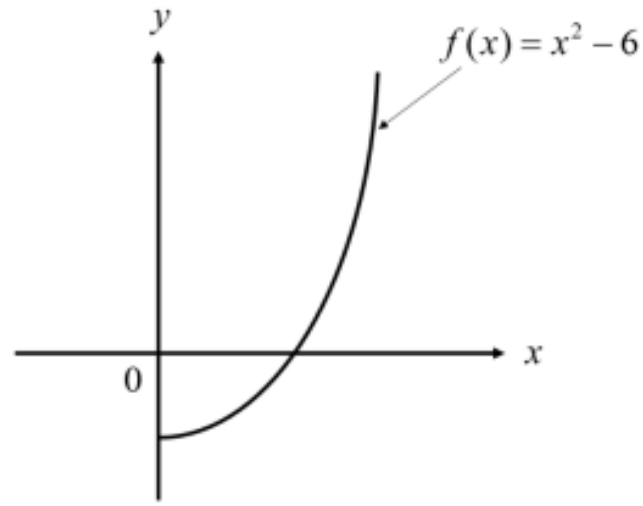
[3 marks]

2 (a)	$f^2(x) = p^2x + pq + q$ atau $f^3(x) = p^3x + p^2q + pq + q$ $p = 2$ $q = 2$	K1 N1 N1
2 (b)	$f^{-1}(x) = \frac{x-2}{2}$ atau $2x + 2 = -6$ -4	K1 N1
2 (c)	$f^4(x) = 16x + 30$ $f^1(x) = 2x + 2$ $f^2(x) = 4x + 6$ $f^3(x) = 8x + 14$ $f^4(x) = 16x + 30$ $f^n(x) = 2^n x + 2^{n+1} - 2$	N1 K1 N1

SABAH (K2)

FUNGSI

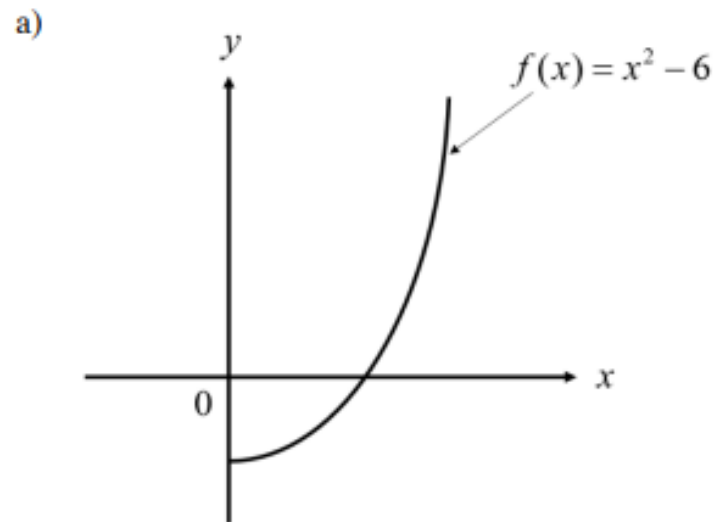
1. Rajah 1 menunjukkan graf fungsi bagi $f(x) = x^2 - 6$ dalam domain $0 \leq x \leq 10$.
 Diagram 1 shows the graph function of $f(x) = x^2 - 6$ in domain $0 \leq x \leq 10$.



Rajah 1/Diagram 1

- a) Lakarkan graf bagi $f^{-1}(x)$.
 Sketch the graph of $f^{-1}(x)$. [2 markah/marks]
- b) Cari koordinat titik persilangan antara kedua-dua graf bagi $f(x)$ dan $f^{-1}(x)$.
 Find the coordinates of the point of intersection of both graphs for $f(x)$ and $f^{-1}(x)$. [3 markah/marks]
- c) Cari fungsi bagi $g(x)$ jika $fg(x) = x^2 + 2x - 5$.
 Find the function of $g(x)$ if $fg(x) = x^2 + 2x - 5$. [2 markah/marks]

Jawapan/Answer:



1	a)	<p>Garis $y = x$ dilukis Graf f^{-1} dilukis.</p>	P1 P1
	b)	$x^2 - 6 = x$ OR $\sqrt{x + 6} = x$ $(x - 3)(x + 2) = 0$ $(3, 3)$	K1 K1 N1
	c)	$[g(x)]^2 - 6 = x^2 + 2x - 5$ atau $(x + 1)^2 - 6$ $g(x) = \pm(x + 1)$	K1 N1

SELANGOR SET 2 (K2)
FUNGSI

- 4 Diberi bahawa $f: x \rightarrow px + q$ dan $f^2: x \rightarrow 4x - 3$, dengan keadaan $p > 0$,
It is given that $f: x \rightarrow px + q$ and $f^2: x \rightarrow 4x - 3$, such that $p > 0$,

(a) cari nilai p dan nilai q ,
find the value of p and of q ,

[4 markah]
 [4 marks]

(b) tentukan $f^3(x)$,
determine $f^3(x)$,

[2 markah]
 [2 marks]

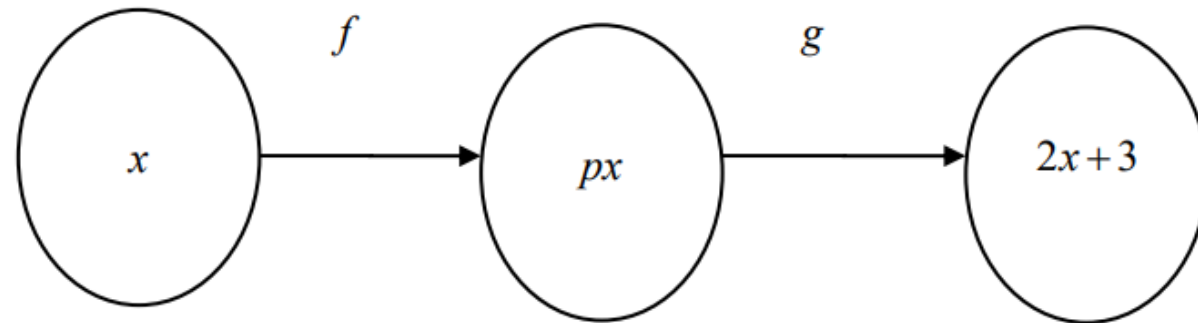
(c) dengan melihat pola $f(x)$, $f^2(x)$ dan $f^3(x)$, tentukan rumus umum $f^n(x)$ untuk n bilangan kali.
by studying the pattern of $f(x)$, $f^2(x)$ and $f^3(x)$, determine the general rule $f^n(x)$ where n is the number of times.

[1 markah]
 [1 mark]

4	(a)	$p(px + q) + q$	K1
		Bandingkan, $p^2x + pq + q$ dengan $4x - 3$	K1
		<u>Selesaikan $p^2 = 4$</u> $p = 2$	N1
		<u>Ganti $p = 2$ ke dalam $pq + q = -3$ & selesaikan</u> $q = -1$	N1
	(b)	$2(4x - 3) - 1$ $f^3(x) = 8x - 7$	K1 N1
	(c)	Dilihat. $f(x) = 2x - 1$ $f^2(x) = 4x - 3$ $f^3(x) = 8x - 7$ $f^n(x) = 2^n x - 2^n + 1$	N1

TERENGGANU (K2)**FUNGSI**

- 1 Rajah 1 menunjukkan pemetaan bagi dua fungsi.
Diagram 1 shows the mapping for the two functions.



Rajah 1 / Diagram 1

Diberi $g^{-1}(x) = x - 3$, cari
Given $g^{-1}(x) = x - 3$, find

- (a) nilai p , [3 markah]
the value of p , [3 marks]
- (b) (i) $f^2(x)$, [2 markah]
[2 marks]
- (ii) fungsi $f^n(x)$ dalam sebutan n dan x . [2 markah]
the function $f^n(x)$ in terms of n and x . [2 marks]

- 1 (a) (i) $gf(x) = 2\left(\frac{x}{p}\right) + 3$ ATAU $f(x) = (2x+3) - 3$ atau setara **K1**
- Banding $g^{-1}(x)$ ATAU $f(x)$ atau setara **K1**
- $p = 2$ **N1**
- (b) (i) $f^2(x) = p(px)$ Ganti $p = 2$ **K1**
- $f^2(x) = 4x$ **N1**
- (ii) Tulis $f^3(x) = 9x$ atau $f^4(x) = 16x$ **K1**
- $f^n(x) = 2^n x$ **N1**