Matematik Tambahan

Modul berfokus

Fungsi

If you FAIL *to plan*

you PLAN *to fail*

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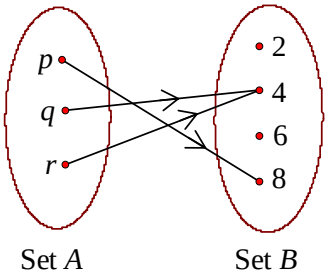
MODUL 1 : BAB : FUNGSI

KERTAS 1

1. Rajah 1 menunjukkan hubungan antara set *A* dan set *B*.
Diagram 1 *shows the relation between set A and set B.*



Rajah 1
Diagram 1

Nyatakan
State

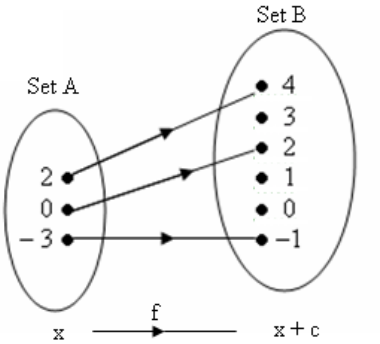
(a) julat hubungan itu,
the range of the relation,

[1 m / Aras R]

(b) jenis hubungan itu.
type of the relation.

[1 m / Aras R]

2. Rajah 2 menunjukkan hubungan antara set *A* dan set *B*.
Diagram 2 *shows the relation between set A and set B.*



Rajah 2
Diagram 2

Nyatakan
State

(a) objek bagi 2,
the object of 2,

[1 m / Aras R]

(b) julat hubungan itu,
the range of the relation,

[1 m / Aras R]

(c) kodomain hubungan itu.
the codomain of the relation.

[1 m / Aras R]

3.

$R = \{a, b, c\}$
$S = \{b, d, f, h, j\}$

Berdasarkan maklumat di atas, hubungan antara R dan S ditakrifkan sebagai hubungan bertertib $\{(a, b), (a, d), (b, f), (b, h)\}$.
Based on the above information, the relation between R and S is defined by the set of ordered pairs $\{(a, b), (a, d), (b, f), (b, h)\}$.

Nyatakan
State

(a) imej bagi a,
the images of a,

[1 m / Aras R]

(b) objek bagi b.
the object of b.

[1 m / Aras R]

4. Hubungan antara dua pembolehubah diberi sebagai $\{(-3, 3), (-2, 0), (-1, -3), (0, -6)\}$.
The relation between two variables is given by $\{(-3, 3), (-2, 0), (-1, -3), (0, -6)\}$.

Nyatakan
State

(a) objek bagi -3,
the object of -3,

[1 m / Aras R]

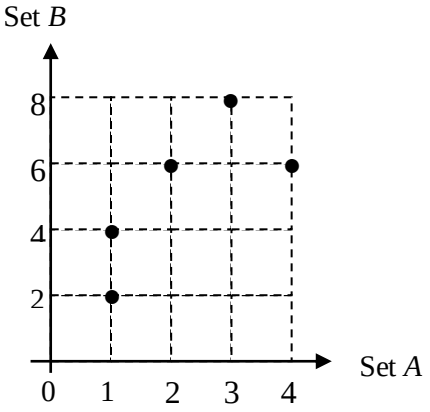
(b) domain bagi hubungan ini,
the domain of this relation,

[1 m / Aras R]

(c) jenis hubungan.
the type of relation.

[1 m / Aras R]

5. Rajah 5 menunjukkan hubungan antara set *A* dan set *B*.
Diagram 5 *shows the relation between set A and set B*.



Rajah 5
Diagram 5

(a) Wakilkan hubungan di atas dalam bentuk set hubungan bertertib.
Represent the above relation in set of ordered pairs.

[1 m / Aras R]

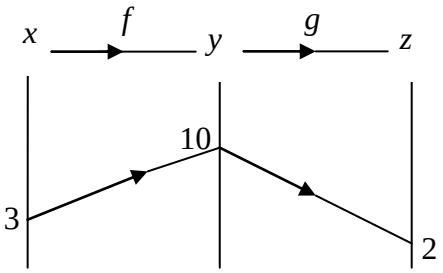
(b) Nyatakan imej bagi 1.
State the images of 1.

[1 m / Aras R]

(c) Nyatakan jenis hubungan.
State the type of the relation.

[1 m / Aras R]

6. Rajah 6 menunjukkan fungsi *f* dan fungsi *g*. Fungsi *f* memetakan *x* kepada *y* dan fungsi *g* memetakan *y* kepada *z*.
Diagram 6 *shows the function f and the function g. Function f maps x to y and function g maps y to z*.



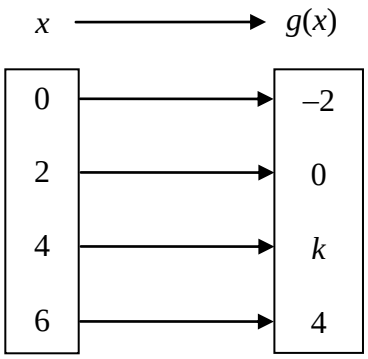
Rajah 6
Diagram 6

Determine

(a) $g^{-1}(2)$, [1 m / Aras R]

(b) $gf(3)$. [1 m / Aras R]

7. Rajah 7 menunjukkan fungsi linear g.
Diagram 7 shows the linear function g.



Rajah 7
Diagram 7

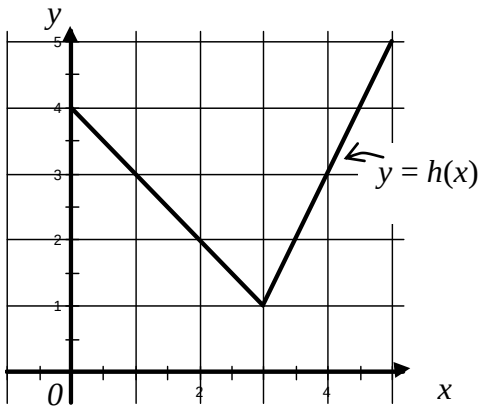
(a) Nyatakan nilai bagi k.
State the value of k.

[1 m / Aras R]

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

[1 m / Aras R]

8. Rajah 8 menunjukkan graf bagi fungsi $h(x)$ bagi domain $0 \leq x \leq 5$.
Diagram 8 shows the graph of function $h(x)$ *for domain* $0 \leq x \leq 5$.



Rajah 8
Diagram 8

Tentukan
Determine

(a) objek bagi 3,
the objects of 3,

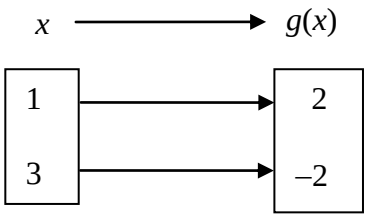
[1 m / Aras R]

(b) julat bagi fungsi itu.
the range of the function.

[1 m / Aras S]

9. Rajah 9 menunjukkan fungsi g di mana $g(x) = \dfrac{m}{nx-2}$.

Diagram 9 *below shows function g where* $g(x) = \dfrac{m}{nx-2}$.



Rajah 9
Diagram 9

Cari nilai bagi *m* dan *n*.
Find the value of m and n.

[3 m / Aras S]

10. Diberi fungsi $f : x \to |3x+4|$, cari

Given the functions $f : x \to |3x+4|$, *find*

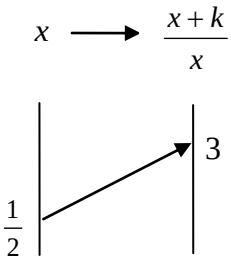
(a) $f(-4)$, [1 m / Aras S]

(b) nilai-nilai x yang mungkin supaya $f(x) = 5$.
the possible values of x *such that* $f(x) = 5$.

[2 m / Aras T]

11. Rajah 11 menunjukkan fungsi $g : x \to \dfrac{x+k}{x}$, $x \neq 0$, dengan keadaan *k* ialah pemalar.

Diagram 11 *shows the function* $g : x \to \dfrac{x+k}{x}$, $x \neq 0$, *where k is a constant*.



Rajah 11
Diagram 11

Cari nilai bagi *k*.
Find the value of k.

[2 m / Aras S]

12. Diberi fungsi $f(x) = 2x + 1$ dan $g(x) = 3 - kx$, cari
Given the function $f(x) = 2x + 1$ *and* $g(x) = 3 - kx$, *find*

(a) $f(2)$, [1 m / Aras S]

(b) nilai bagi *k* dengan keadaan $gf(2) = -7$.
the value of k such that $gf(2) = -7$.

[2 m / Aras S]

13. Diberi bahawa $f(x) = \frac{2x-3}{2k}, k \neq 0$ dan $f^{-1}(x) = \frac{5x+3}{m}, m \neq 0$, dengan keadaan *k* dan *m* adalah pelamar. Cari nilai-nilai bagi *k* dan *m*.
Given that $f(x) = \frac{2x-3}{2k}, k \neq 0$ *and* $f^{-1}(x) = \frac{5x+3}{m}, m \neq 0$, *where k and m are constants. Find the values of k and m.*

[3 m / Aras S]

14. Diberi bahawa $f(x) = 4x + 3$ dan $g(x) = x^2 - 5x + 1$.
Given the function $f(x) = 4x + 3$ *and* $g(x) = x^2 - 5x + 1$.

Cari
Find

(a) $f^{-1}(7)$, [2 m / Aras S]

(b) $gf(x)$. [2 m / Aras S]

15. Fungsi *f* ditakrifkan sebagai $f : x \to 2x + k$. Diberi bahawa $f^2(4) = 1$.
Function f is defined as $f : x \to 2x + k$. *Given that* $f^2(4) = 1$.

Cari
Find

(a) nilai *k*,
the value of k,

[2 m / Aras S]

(b) seterusnya, fungsi $f^{-1}(x)$.
thus, the function $f^{-1}(x)$.

[2 m / Aras S]

16. Fungsi *h* ditakrifkan sebagai $h(x)=\dfrac{7}{3+x}, x\neq -3$.

The function h is defined as $h(x)=\dfrac{7}{3+x}, x\neq -3$.

Cari
Find

(a) $h^{-1}(x)$, [2 m / Aras S]

(b) $h^{-1}(2)$. [1 m / Aras S]

17. Diberi bahawa $f^{-1}: x\rightarrow \dfrac{2x-3}{4}$, find

Given that $f^{-1}: x\rightarrow \dfrac{2x-3}{4}$, *find*

(a) $f(x)$, [2 m / Aras S]

(b) nilai bagi $f(-2)$.
the value of $f(-2)$.

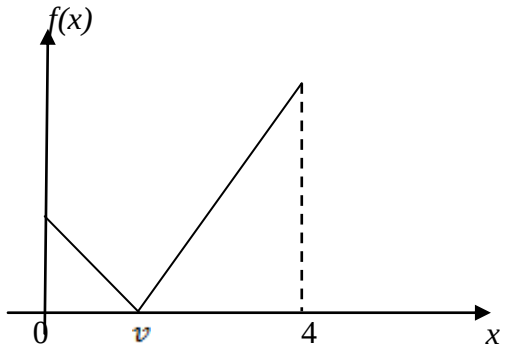
[1 m / Aras S]

18. Diberi fungsi songsang bagi $f: x\rightarrow 3x+m$ ialah $f^{-1}: x\rightarrow \dfrac{x-7}{n}$, cari nilai-nilai *m* dan *n*.

Given that the inverse function of $f: x\rightarrow 3x+m$ *is* $f^{-1}: x\rightarrow \dfrac{x-7}{n}$, *find the values of m and n.* [3 m / Aras S]

19. Rajah 19 menunjukkan graf bagi fungsi $f(x)=|4x-5|$, untuk domain $0\leq x\leq 4$.

Diagram 19 *shows the graph of the function* $f(x)=|4x-5|$, *for the domain* $0\leq x\leq 4$.



Rajah 19
Diagram 19

Nyatakan
State

(a) nilai bagi *v*,
the value of v,

[2 m / Aras S]

(b) julat bagi *f*(*x*) sepadan dengan domain yang diberi.
the range of f(x) corresponding to the given domain.

[2 m / Aras S]

20. Maklumat berikut merujuk kepada fungsi *f* dan *g*.
The following information refers to the function f and g.

$$f : x \to 5x + 1$$
$$g : x \to x - 3$$

Cari $f^{-1}g(x)$.
Find $f^{-1}g(x)$.

[3 m / Aras S]

21. Diberi fungsi $f : x \to 3x - 2$ dan $g : x \to 2x^2 - 3$, cari
Given the function $f : x \to 3x - 2$ *and* $g : x \to 2x^2 - 3$, *find*

(a) $f^{-1}(4)$, [2 m / Aras S]

(b) $gf(x)$. [2 m / Aras S]

22. Diberi fungsi $h(x) = 3x + 1$ dan $g(x) = \frac{x}{3}$. Cari.
Given the function $h(x) = 3x + 1$ *and* $g(x) = \frac{x}{3}$. *Find*

(a) $h^{-1}(x)$, [2 m / Aras S]

(b) $gh^{-1}(7)$. [2 m / Aras S]

23. Diberi fungsi $f : x \to 3x - 4$, cari
Given the function $f : x \to 3x - 4$, *find*

(a) $f^{-1}(x)$, [1 m / Aras S]

(b) nilai p dengan keadaan $f^{-1}(2p-1)=p$.
the value of p such that $f^{-1}(2p-1)=p$.

[2 m / Aras S]

24. Diberi fungsi $f^{-1}(x)=\frac{x+5}{2}$ dan $g(x)=3x+8$, cari
Given the function $f^{-1}(x)=\frac{x+5}{2}$ *and* $g(x)=3x+8$, *find*

(a) $f(x)$, [1 m / Aras S]

(b) nilai k dengan keadaan $g(2k)=f^{-1}(3)$.
the value of k such that $g(2k)=f^{-1}(3)$.

[2 m / Aras S]

25. Diberi fungsi $g:x\to a-bx$, dengan keadaan a dan b adalah pemalar dan $b>0$ dan fungsi gubahan $g^2:x\to 9x+8$. Cari nilai-nilai bagi a dan b.
Given the function $g:x\to a-bx$, *where a and b are constant and b > 0 and the composite function* $g^2:x\to 9x+8$. *Find the values of a and b.*

[3 m / Aras T]

26. Diberi fungsi $f(x)=\frac{1}{2x}, x\neq 0$ dan fungsi gubahan $fg(x)=4x$, cari
Given the function $f(x)=\frac{1}{2x}, x\neq 0$ *and the composite function* $fg(x)=4x$, *find*

(a) $g(x)$, dalam sebutan k,
$g(x)$, *in terms of k,*

[2 m / Aras T]

(b) nilai x apabila $gf(x)=2$.
the value of x when $gf(x)=2$.

[2 m / Aras T]

27. Diberi fungsi $g:x\to 3x-2$ dan $gf:x\to 3x^2+4$, cari
Given the function $g:x\to 3x-2$ *dan* $gf:x\to 3x^2+4$, *find*

(a) $g^{-1}(x)$, [2 m / Aras S]

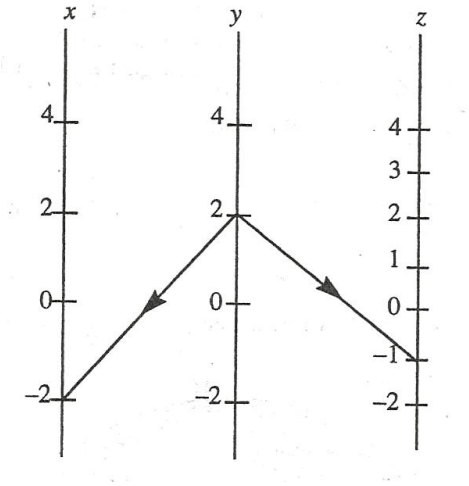
(b) $f(x)$. [2 m / Aras T]

28. Diberi fungsi $f(x) = x+1$. Cari fungsi g jika $fg(x) = x^2 + 3x + 5$ [4 m/Aras T]

KERTAS 2

1. Rajah 1 mewakili pemetaan y kepada x oleh fungsi $g : y \to ay + b$ dan pemetaan y kepada z oleh fungsi $h : y \to \dfrac{6}{2y-b}$, $y \neq \dfrac{b}{2}$.

Diagram 1 *shows the mapping of y to x given by the function* $g : y \to ay + b$ *and the mapping of y to z given by the function* $h : y \to \dfrac{6}{2y-b}$, $y \neq \dfrac{b}{2}$.



Rajah 1
Diagram 1

Carikan
Find

(a) nilai a dan nilai b,
the values of a and b,

[2 m / Aras S]

(b) fungsi yang memetakan x kepada y,
the function that maps x to y,

[2 m / Aras T]

(c) fungsi yang memetakan x kepada z.
the function that maps x to z.

[2 m / Aras T]

2. Diberi $g^{-1}(x)=\dfrac{5-kx}{3}$ dan $f(x)=3x^2-5$.

Given $g^{-1}(x)=\dfrac{5-kx}{3}$ *and* $f(x)=3x^2-5$.

Carikan
Find

(a) $g(x)$, [2 m/ Aras S]

(b) nilai *k* supaya $g(x^2)=2f(-x)$.
the value of *k* such that $g(x^2)=2f(-x)$.

[3 m / Aras T]

3. Diberi $f:x\to k-mx$. Carikan
Given $f:x\to k-mx$. *Find*

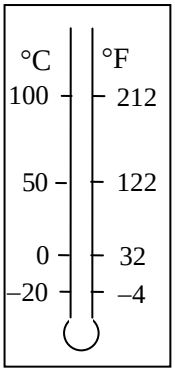
(a) $f^{-1}(x)$ dalam sebutan *k* dan *m*,
$f^{-1}(x)$ *in terms of k dan m,*

[2 m/ Aras S]

(b) nilai *k* dan nilai *m*, jika $f^{-1}(14)=-4$ dan $f(5)=-13$.
the values of k and m, if $f^{-1}(14)=-4$ *and* $f(5)=-13$.

[4 m/ Aras T]

4. Rajah 4 menunjukkan skala bagi suhu dalam Celsius (°C) dan Fahrenheit (°F) pada suatu termometer. Hubungan antara suhu dalam *x* °C dan *y* °F diberi oleh $y=1.8x+k$, dengan keadaan *k* ialah pemalar.
Diagram 4 *shows the scales of temperature in degree Celsius (°C) and degree Fahrenheit (°F) on a thermometer. The relationship between temperature in x °C and y °F is given by function* $y=1.8x+k$, *where k is a constant.*



Rajah 4
Diagram 4

(a) Cari nilai *k*.
Find the value of k.

[2 m / Aras S]

(b) Jika suhu hari ini ialah 32°C, apakah suhu dalam °F?
If today's temperature is 32°C, what is the temperature in °F?

[2 m / Aras S]

(c) Bentukkan satu fungsi yang membolehkan kita menukar suhu dari unit darjah Fahrenheit (°F) kepada darjah Celsius (°C).

[2 m/ Aras T]

JAWAPAN : MODUL 1 : BAB : FUNGSI

KERTAS 1

1. (a) {4, 8}
   (b) Banyak kepada satu

2. (a) 0
   (b) {4, 2, –1}
   (c) {4, 3, 2, 1, 0, –1}

3. (a) *b*, *d*
   (b) *a*

4. (a) –1
   (b) {–3, –2, –1, 0}
   (c) Satu kepada satu

5. (a) {(1, 2), (1, 4), (2, 6), (3, 8), (4, 6)}
   (b) 2, 4
   (c) Banyak kepada banyak

6. (a) 10
   (b) 2

7. (a) 2
   (b) $g : x \to x - 2$

8. (a) 1, 4
   (b) $1 \le h(x) \le 5$

9. $m = -2$, $n = 1$

10. (a) 8
    (b) $\frac{1}{3}$, –3

11. 1

12. (a) 5
    (b) 2

13. $k = \frac{5}{2}$, $m = 2$

14. (a) 1
    (b) $16x^2 + 4x - 5$

15. (a) –5
    (b) $\frac{x+5}{2}$

16. (a) $\frac{7}{x} - 3, x \ne 0$
    (b) $\frac{1}{2}$

17. (a) $\frac{4x+3}{2}$
    (b) $-\frac{5}{2}$

18. $m = 7$, $n = 3$

19. (a) $\frac{5}{4}$
    (b) $0 \le f(x) \le 11$

20. $\frac{x-4}{5}$

21. (a) 2
    (b) $9x^2 - 12x + 4$

22. (a) $\frac{x-1}{3}$
    (b) $\frac{2}{3}$

23. (a) $\frac{x+4}{3}$
    (b) 3

24. (a) $2x - 5$
    (b) $-\frac{2}{3}$

25. $a = -4$, $b = 3$

26. (a) $\frac{1}{8x}, x \ne 0$
    (b) 8

27. (a) $\frac{x+2}{3}$

(b) x^2+2

28. $g(x) = x^2 + x + 3$

KERTAS 2

1. (a) $a = -6$, $b = 10$

(b) $g^{-1}(x) = \frac{10-x}{6}$

(c) $hg^{-1}(x) = -\frac{18}{x+20}, x \neq -20$

2. (a) $\frac{5-3x}{k}$

(b) $k = -\frac{1}{2}$

3. (a) $\frac{k-x}{m}$

(b) $k = 2$, $m = 3$

4. (a) $k = 32$

(b) 89.6°F

(c) $f(y) = (y-32)/1.8$

or $f^{-1}(x) = (x-32)/1.8$

or equivalent.