

# ADDMATHS TINGKATAN 4 CIKGU HISHAM

ADD MATHS TINGKATAN 4			
BAB	TOPIK	TARIKH	CATATAN
1	FUNGSI		
2	FUNGSI KUADRATIK		
3	SISTEM PERSAMAAN		
4	INDEKS, SURD DAN LOGARITMA		
5	JANJANG		
6	HUKUM LINEAR		
7	GEOMETRI KOORDINAT		
8	VEKTOR		
9	PENYELESAIAN SEGI TIGA		
10	NOMBOR INDEKS		

## BAB 1 CHAPTER 1 FUNGSI FUNCTION

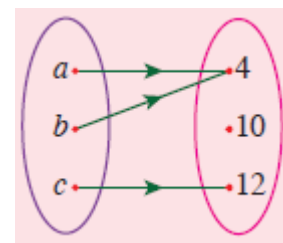
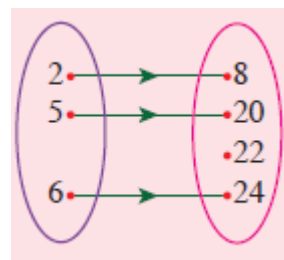
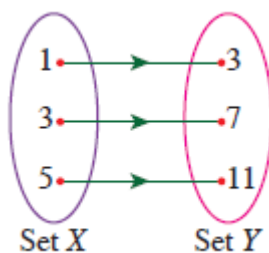
### 1.1 FUNGSI FUNCTION

1. Satu fungsi ialah satu hubungan dengan keadaan setiap objek dalam domain mempunyai hanya satu imej.

*A function is a relation in which every object in a domain has only one image.*

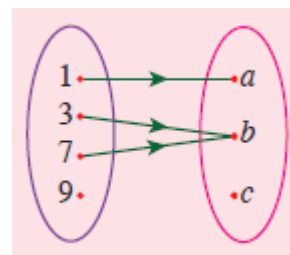
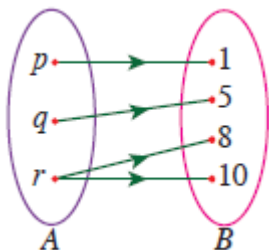
2. Contoh-contoh fungsi:

*Example of functions:*



3. Contoh-contoh bukan fungsi:

*Example of non-functions:*

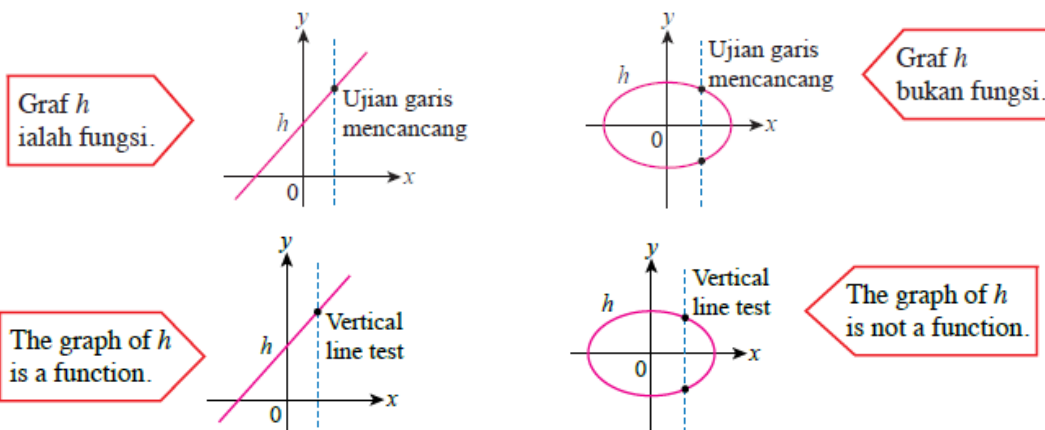


4. Apabila diberi suatu graf, kita boleh menggunakan **ujian garis mencancang** untuk menentukan sama ada graf tersebut ialah fungsi atau bukan.

*When a graph is given, we use the **vertical line test** to determine whether the given graph is a function or otherwise.*

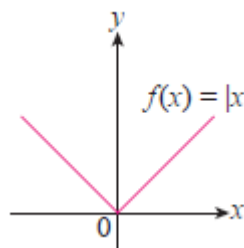
5. Jika garis mencancang memotong graf hanya pada satu titik, maka hubungan itu merupakan fungsi.

*If the vertical line cuts only at one point on the graph, then the relation is a function.*



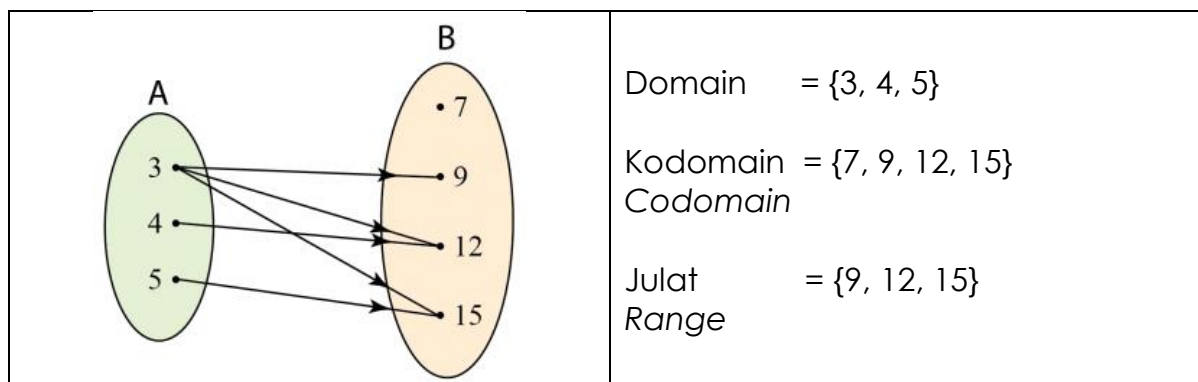
6. Fungsi nilai mutlak  $f(x) = |x|$  bermaksud **Absolute value function**  $f(x) = |x|$  means

$$|x| = \begin{cases} x & \text{jika } x \geq 0 \\ -x & \text{jika } x < 0 \end{cases}$$



$|x|$  dibaca sebagai “modulus bagi  $x$ ” /  $|x|$  is read as “modulus of  $x$ ”.

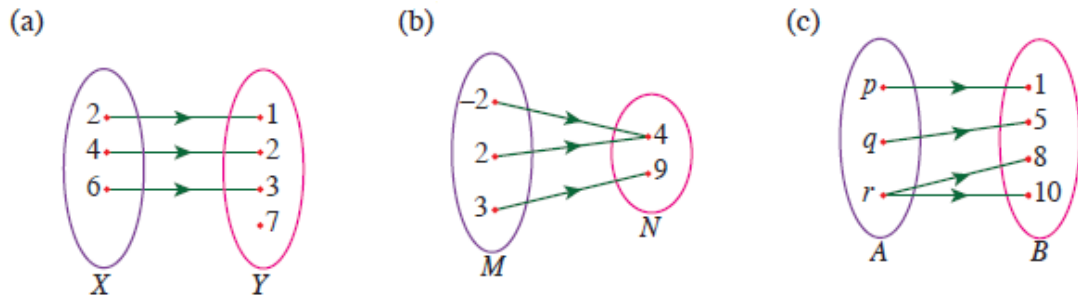
7. Domain, Kodomain, dan Julat  
Domain, Codomain and Range



8. Contoh 1 / Example 1

Nyatakan sama ada hubungan yang berikut ialah fungsi atau bukan. Berikan alasan.

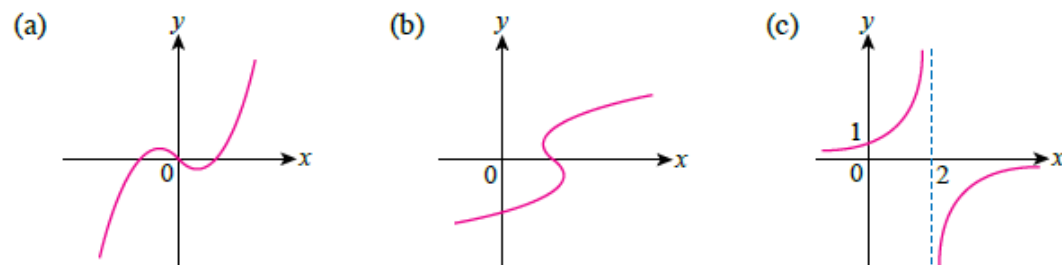
State whether each of the following relation is a function. State your reason.



9. Contoh 2 / Example 2

Tentukan sama ada graf yang berikut ialah fungsi atau bukan dengan menggunakan ujian garis mencancang.

Determine whether each of the following graphs is a function by using vertical line test.

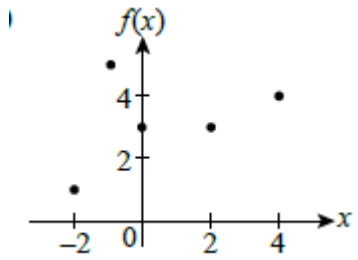
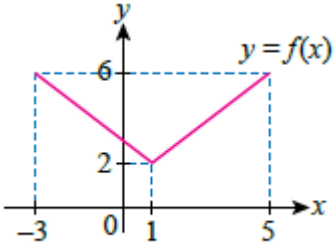


10. Contoh 3 / Example 3

Tentukan domain, kodomain dan julat bagi setiap fungsi yang berikut.

Determine the domain, codomain and range of the following functions.

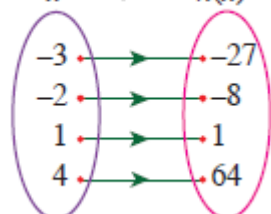
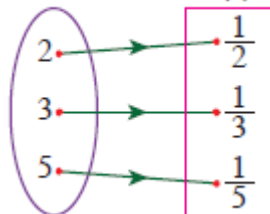
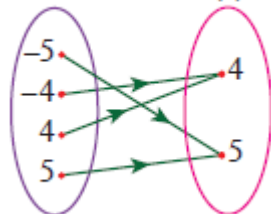
	<p>Domain =</p> <p>Kodomain =</p> <p>Codomain =</p> <p>Julat =</p> <p>Range =</p>
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	<p>Domain =</p> <p>Kodomain = Codomain</p> <p>Julat = Range</p>
	<p>Domain =</p> <p>Kodomain = Codomain</p> <p>Julat = Range</p>

11. Contoh 4 / Example 4

Dengan menggunakan tatatanda fungsi, ungkapkan  $h$  dalam sebutan  $x$  bagi setiap gambar rajah anak panah yang berikut.

By using the function notation, express  $h$  in terms of  $x$  for each of the following arrow diagrams.

<p><math>x \longrightarrow h(x)</math></p> 	<p><math>x \longrightarrow h(x)</math></p> 	<p><math>x \longrightarrow h(x)</math></p> 

## 12. Contoh 5 / Example 5

Lakar setiap graf  $f(x)$  berikut. Kemudian, nyatakan julat bagi  $f(x)$  yang sepadan dengan domain yang diberikan.

*Sketch each of the following graphs  $f(x)$ . Then state the corresponding range of  $f(x)$  for the given domain.*

a)  $f(x) = |x - 3|$  untuk domain  $-1 \leq x \leq 6$ .  
 $f(x) = |x - 3|$  for the domain  $-1 \leq x \leq 6$ .

b)  $f(x) = |4 - 2x|$  untuk domain  $-2 \leq x \leq 4$ .  
 $f(x) = |4 - 2x|$  for the domain  $-2 \leq x \leq 4$ .

## 13. Contoh 6 / Example 6

Fungsi  $f$  ditakrifkan oleh  $f: x \rightarrow 3x + \frac{5}{x}, x \neq m$ . Cari  
Function  $f$  is defined by  $f: x \rightarrow 3x + \frac{5}{x}, x \neq m$ . Find

- nilai  $m$  / value of  $m$
- imej bagi  $\frac{1}{3}$  / the image of  $\frac{1}{3}$
- nilai-nilai  $x$  yng mungkin apabila imejnya ialah 8  
the possible values of  $x$  when their image is 8

## 14. Contoh 7 / Example 7

Diberi fungsi  $h(x) = \frac{kx-3}{x-1}, x \neq m$ . Cari nilai  $k$  jika

Given the function  $h(x) = \frac{kx-3}{x-1}, x \neq m$ . Find the value of  $k$  such that

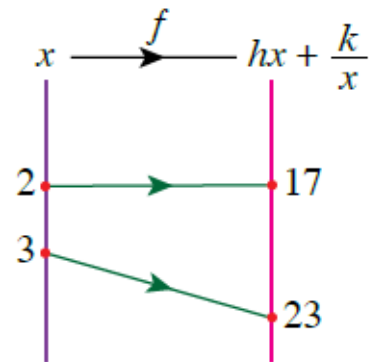
- $h(2) = 5$
- $h(3) = k$
- $h(k) = k$

## 15. Contoh 8 / Example 8

Gambar rajah anak panah di sebelah mewakili fungsi  $f(x) = hx + \frac{k}{x}, x \neq 0$ . Cari

The arrow diagram represents the function  $f(x) = hx + \frac{k}{x}, x \neq 0$ . Find

- nilai  $h$  dan  $k$  / the value of  $h$  and  $k$
- imej bagi 6 / the image of 6



## 16. Contoh 9 / Example 9

Diberi fungsi  $f(x) = |3x - 2|$ . Cari nilai  $x$  dengan keadaan

Given the function  $f(x) = |3x - 2|$ . Find the values of  $x$  such that

- $f(x) = 5$
- $f(x)$  memetakan kepada sendiri /  $f(x)$  maps onto itself.

## 17. Contoh 10 / Example 10

Diberi fungsi  $f(x) = |x + 4|$ . Cari  
Given the function  $f(x) = |x + 4|$ . Find

- a) imej bagi -5 dan -3 / the image of -5 and -3
- b) nilai-nilai  $x$  jika  $f(x) = 6$  / the values of  $x$  if  $f(x)=6$

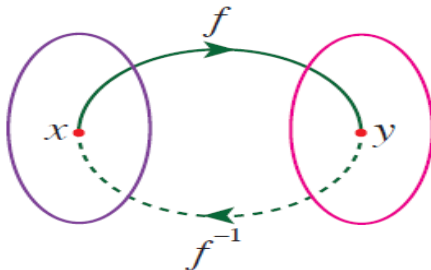
## 18. Contoh 11 / Example 11

Diberi  $f(x) = \frac{2x+h}{x-3}$ ,  $x \neq k$  dan  $f(4)=13$ . Cari  
Given  $f(x) = \frac{2x+h}{x-3}$ ,  $x \neq k$  and  $f(4)=13$ . Find

- a) nilai  $k$  / value of  $k$
- b) nilai  $h$  / the value of  $h$

## 1.2 FUNGSI SONGSANG INVERSE FUNCTION

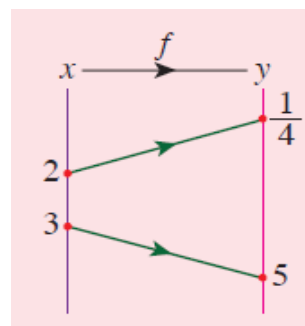
1. Fungsi songsang bagi suatu fungsi  $f$  boleh ditulis sebagai  $f^{-1}$ .  
*Inverse function of a function  $f$  can be written as  $f^{-1}$ .*



### 2. Contoh 12 / Example 12

Dalam gambar rajah anak panah, fungsi  $f$  memetakan  $x$  kepada  $y$ .  
*In the arrow diagram, the function  $f$  maps  $x$  to  $y$ .  
Determine*

- a)  $f(2)$
- b)  $f(3)$
- c)  $f^{-1}\left(\frac{1}{4}\right)$
- d)  $f^{-1}(5)$



3. Untuk menentukan sama ada graf bagi suatu fungsi mempunyai songsangan, **ujian garis mengufuk** dilakukan.

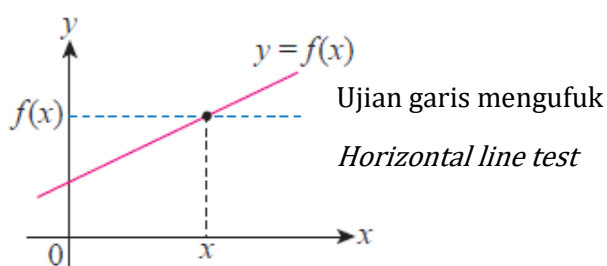
*To determine whether the graph of a function has an inverse function, carry out **the horizontal line test**.*

4. Jika garis mengufuk itu memotong suatu graf fungsi hanya pada satu titik, maka fungsi tersebut mempunyai fungsi songsang.

*If the horizontal line cuts the graph of the function at only one point, then it has an inverse function.*

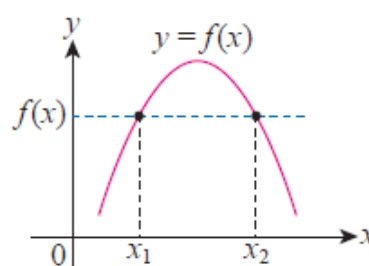
5. Sebaliknya, jika garis mengufuk itu memotong suatu graf fungsi pada dua titik atau lebih, maka fungsi itu tidak mempunyai fungsi songsang.

*Conversely, if the horizontal line cuts the graph at two or more points, the function has no inverse function.*



$f$  mempunyai fungsi songsang

$f$  has an inverse function



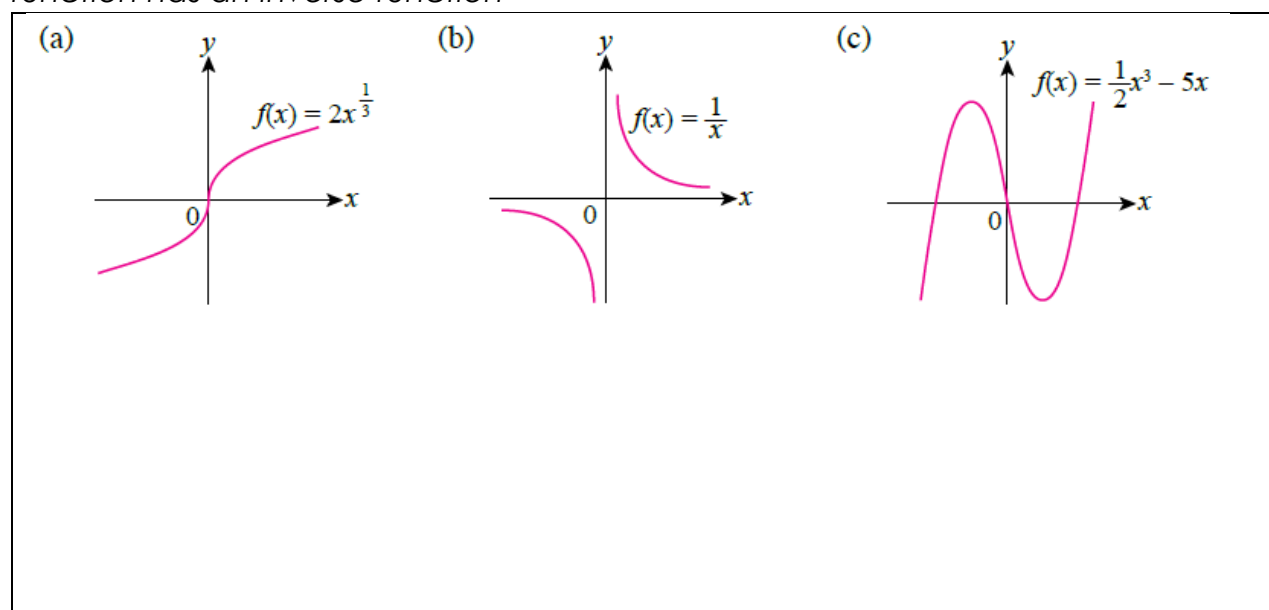
$f$  tidak mempunyai fungsi songsang

$f$  does not have an inverse function

6. Contoh 13 / Example 13

Dengan menggunakan ujian garis mengufuk, tentukan sama ada setiap fungsi yang berikut mempunyai fungsi songsang atau tidak.

*By applying the horizontal line test, determine whether each of the following function has an inverse function*



Menentukan fungsi songsang / Determine the inverse function

7. Contoh 14 / Example 14

Katakan / Let	$f(x) = 3x - 2$ $f^{-1}(x) = y$ $f(y) = x$ $3y - 2 = x$ $y = \frac{1}{3}(x + 2)$ $\therefore f^{-1}(x) = \frac{1}{3}(x + 2)$
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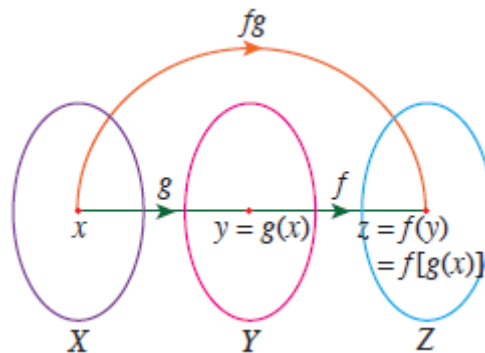
8. Contoh 15 / Example 15

Tentukan fungsi songsang bagi setiap fungsi yang berikut

Determine the inverse function for the following function

a) $f(x) = 5x$	b) $g(x) = x - 8$
c) $h(x) = \frac{1}{3}x + 4$	d) $f(x) = 8x^3 - 1$

## 1.3 FUNGSI GUBAHAN / COMPOSITE FUNCTIONS



Menentukan fungsi gubahan  
Determining composite functions

9. Contoh 16 / Example 16

Diberi fungsi  $f$ , cari  $f^2$  dan  $f^3$ .

Given a function  $f$ , find  $f^2$  and  $f^3$ .

a)  $f(x) = 2x - 5$

b)  $f(x) = \frac{2}{x+1}$

## 10. Contoh 17 / Example 17

Diberi  $f(x) = x - 5$  dan  $g(x) = x^2 + 3x$ , cariGiven  $f(x) = x - 5$  and  $g(x) = x^2 + 3x$ , find

a) $fg(x)$	b) $gf(x)$
c) $fg(3)$	d) $gf(-2)$

## 11. Contoh 18 / Example 18

Diberi  $g(x) = \frac{2}{x-1}$ ,  $x \neq 1$  dan  $h(x) = 4 - 3x$ , cariGiven  $g(x) = \frac{2}{x-1}$ ,  $x \neq 1$  dan  $h(x) = 4 - 3x$ , find

a) $gh(x)$	b) $hg(x)$
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## 12. Contoh 19 / Example 19

Selesaikan/ Solve

Diberi bahawa  $g(x) = \frac{4}{x}, x \neq 0$  dan  $h(x) = 5 - 2x$ , cariIt is given that  $g(x) = \frac{4}{x}, x \neq 0$  and  $h(x) = 5 - 2x$ , find

a) $gh(x)$	b) $hg(x)$
c) nilai $x$ apabila $gh(x) = 4$ the value of $x$ when $gh(x) = 4$	d) nilai $x$ apabila $hg(x) = 7$ the value of $x$ when $hg(x) = 7$

Menentukan suatu fungsi apabila suatu fungsi gubahan dan salah satu fungsinya diberi.

Determining a function when a composite function and one of the functions are given.

## 13. Formula

**I = Insider function**  
**S = Substitution**  
**O = Outsider function**  
**I = Inverse**

**D = Dalam**  
**G = Ganti**  
**L = Luar**  
**S = Songsang**

14. Contoh 20 / Example 20

Diberi  $fg$  dan  $f$ , cari  $g$ .Given  $fg$  and  $f$ , find  $g$ .

a) $fg(x) = 2x^2 - 5x, f(x) = x + 3$	b) $fg(x) = 2x - 7, f(x) = 3x + 1$
c) $fg(x) = 8x - 7, f(x) = x - 2$	d) $fg(x) = 2x^2 - 4x + 7, f(x) = x - 3$

15. Contoh 21 / Example 21

Diberi  $fg$  dan  $g$ . Cari  $f$ .Given  $fg$  and  $g$ . Find  $f$ .

a) $fg(x) = 2x - 4, g(x) = \frac{1}{2}x + 3$	b) $fg(x) = 2x^2 + 3x, g(x) = 4 - x$
c) $fg(x) = 3x - 3, f(x) = 3x - 4$	d) $fg(x) = \frac{8}{x+2}, f(x) = \frac{x}{4}$

## 16. Contoh 22 / Example 22

Fungsi  $g$  ditakrifkan sebagai  $g(x) = x - 3$  dan fungsi  $fg(x) = 2x^2 - 6x - 7$ .

Cari

*A function  $g$  is defined by  $g(x) = x - 3$  and another function  $fg(x) = 2x^2 - 6x - 7$ . Find*

- a)  $f(x)$
- b) nilai-nilai  $p$  dengan keadaan  $f(p) = 1$   
*the values of  $p$  for which  $f(p) = 1$*

## 17. Contoh 23 / Example 23

Diberi fungsi  $g(x) = 3x + 2$  dan  $h(x) = 4x + 8$ . Cari

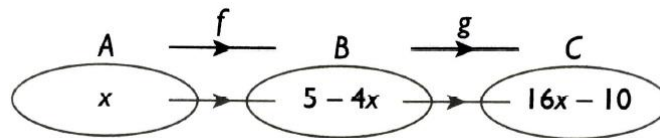
*Given that function  $g(x) = 3x + 2$  and  $h(x) = 4x + 8$ . Find*

- a)  $g^{-1}(x)$
- b)  $hg^{-1}(x)$

## 18. Contoh 24 / Example 24

Dalam rajah, fungsi  $f$  memetakan set A kepada set B dan fungsi  $g$  memetakan set B kepada set C.

*In diagram, the function  $f$  maps set A to set B and the function  $g$  maps set B to set C.*



Find / Cari

a) Dalam sebutan  $x$ , fungsi

*In terms of  $x$ , function*

- i. yang memetakan set B kepada set A  
*which maps set B to set A*
- ii.  $g(x)$

b) Nilai  $x$  dengan keadaan  $fg(x) = 6x - 5$

*The value of  $x$  such that  $fg(x) = 6x - 5$*