

**Tingkatan 4 Bab 1**  
**Fungsi**  
**Penyelesaian Lengkap**

**Praktis Formatif 1.1a**

- 1 (a) Setiap imej diperoleh dengan menukar tanda setiap objek. Maka,  $f(x) = -x$ .
- (b) (i) Domain = {6, 7, 8}  
(ii) Kodomain = {-6, -7, -8, -9}  
(iii) Julat = {-6, -7, -8}  
(iv) Objek bagi -6 ialah 6.  
(v) Imej bagi 7 ialah -7.
- 2 (a) Oleh sebab garis mencancang bersilang dengan graf sekali sahaja, maka ia ialah satu fungsi.  
(b) Oleh sebab garis mencancang bersilang dengan graf dua kali, maka ia bukan fungsi.

3  $2x - 1 \neq 0$

$$x \neq \frac{1}{2}$$

Tetapi diberi bahawa  $h \neq \frac{1}{2}$ .

Maka, dengan perbandingan,  $h = \frac{1}{2}$ .

**Praktis Formatif 1.1b**

- 1 (a) Domain =  $-4 \leq x \leq 4$   
Julat =  $1 \leq f(x) \leq 5$
- (b) Domain =  $-1 \leq x \leq 2$   
Julat =  $0 \leq g(x) \leq 9$

**Praktis Formatif 1.1c**

1 (a)  $f(x) = \frac{18}{2x-9}$

(i)  $f(0) = \frac{18}{2(0)-9} = -2$

(ii)  $f(3) = \frac{18}{2(3)-9} = \frac{18}{-3} = -6$

(b) (i)  $f(x) = 2$

$$\frac{18}{2x-9} = 2$$

$$18 = 4x - 18$$

$$4x = 36$$

$$x = 9$$

(ii)  $f(x) = 6$

$$\frac{18}{2x-9} = 6$$

$$18 = 12x - 54$$

$$12x = 72$$

$$x = 6$$

2 (a)  $f(3) = -5$

$$\frac{a}{3-b} = -5$$

$$a = -15 + 5b \dots (1)$$

$$f(-5) = -1$$

$$\frac{a}{-5-b} = -1$$

$$a = 5 + b \dots (2)$$

Gantikan (2) ke dalam (1):

$$5 + b = -15 + 5b$$

$$4b = 20$$

$$b = 5$$

Daripada (2) :  $a = 5 + 5 = 10$

(b)  $f(x) = \frac{10}{x-5}$

$$x - 5 \neq 0$$

$$x \neq 5$$

Maka, nilai  $x$  dengan keadaan  $f$  adalah tak tertakrif ialah 5.

3 (a)  $f(x) = \frac{px+q}{x-2}$

$$f(3) = 4$$

$$\frac{3p+q}{3-2} = 4$$

$$3p+q = 4$$

$$q = 4 - 3p \dots (1)$$

$$f(1) = 2$$

$$\frac{p+q}{1-2} = 2$$

$$p+q = -2 \dots (2)$$

Gantikan (1) ke dalam (2):

$$p + 4 - 3p = -2$$

$$-2p = -6$$

$$p = 3$$

Daripada (1) :

$$q = 4 - 3(3) = -5$$

$$(b) f(x) = \frac{3x-5}{x-2}$$

Nilai  $x$  dengan keadaan  $f$  adalah tak tertakrif ialah 2.

$$(c) f(x) = \frac{4}{3}x$$

$$\frac{3x-5}{x-2} = \frac{4x}{3}$$

$$9x-15 = 4x^2 - 8x$$

$$4x^2 - 17x + 15 = 0$$

$$(x-3)(4x-5) = 0$$

$$x = 3 \text{ atau } x = \frac{5}{4}$$

$$4 (a) g(x) = ax + \frac{b}{x}$$

$$g(2) = 7$$

$$2a + \frac{b}{2} = 7$$

$$4a + b = 14$$

$$b = 14 - 4a \dots (1)$$

$$g(-1) = -5$$

$$-a + \frac{b}{-1} = -5$$

$$-a - b = -5 \dots (2)$$

Gantikan (1) ke dalam (2) :

$$-a - (14 - 4a) = -5$$

$$-a - 14 + 4a = -5$$

$$3a = 9$$

$$a = 3$$

Daripada (1) :  $b = 14 - 4a$

$$b = 14 - 4(3) = 2$$

$$(b) g(x) = 3x + \frac{2}{x}$$

$g$  adalah tak tertakrif apabila  $x = 0$ .

$$(c) g(x) = 7$$

$$3x + \frac{2}{x} = 7$$

$$3x^2 + 2 = 7x$$

$$3x^2 - 7x + 2 = 0$$

$$(3x-1)(x-2) = 0$$

$$x = \frac{1}{3} \text{ atau } x = 2$$

$x = 2$  tidak diterima.

$$\therefore x = \frac{1}{3}$$

$$5 (a) g(x) = a + bx$$

$$g(1) = -3$$

$$a + b = -3$$

$$a = -3 - b \dots (1)$$

$$g(-2) = 3$$

$$a - 2b = 3 \dots (2)$$

Gantikan (1) ke dalam (2) :

$$-3 - b - 2b = 3$$

$$-3 - 3b = 3$$

$$-3b = 6$$

$$b = -2$$

Daripada (1):  $a = -3 - (-2) = -1$

$$(b) g(x) = -1 - 2x$$

$$g(n^2 + 1) = 5n - 6$$

$$-1 - 2(n^2 + 1) = 5n - 6$$

$$-2n^2 - 2 - 1 - 5n + 6 = 0$$

$$-2n^2 - 5n + 3 = 0$$

$$2n^2 + 5n - 3 = 0$$

$$(2n-1)(n+3) = 0$$

$$n = \frac{1}{2} \text{ atau } -3$$

$$6 f(x) = x$$

$$\frac{5x-4}{x+1} = x$$

$$5x-4 = x^2 + x$$

$$x^2 - 4x + 4 = 0$$

$$(x-2)^2 = 0$$

$$x = 2$$

$$7 f(x) = x$$

$$\frac{12}{x-4} = x$$

$$12 = x^2 - 4x$$

$$x^2 - 4x - 12 = 0$$

$$(x-6)(x+2) = 0$$

$$x = 6 \text{ atau } -2$$

$$8 \text{ (a) } f(x) = px + qx^2$$

$$f(-1) = -5$$

$$-p + q = -5$$

$$q = p - 5 \dots (1)$$

$$f(-2) = -16$$

$$-2p + 4q = -16$$

$$p - 2q = 8 \dots (2)$$

Gantikan (1) ke dalam (2) :

$$p - 2(p - 5) = 8$$

$$p - 2p + 10 = 8$$

$$-p = -2$$

$$p = 2$$

Daripada (1) :  $q = 2 - 5 = -3$

$$(b) f(x) = 2x - 3x^2$$

$$f(x) = x$$

$$2x - 3x^2 = x$$

$$3x^2 - x = 0$$

$$x(3x - 1) = 0$$

$$x = 0 \text{ atau } \frac{1}{3}$$

### Praktis Formatif 1.1d

$$1 \ h(x) = |x^2 - 4x - 3|$$

$$(a) \ h(-3) = |(-3)^2 - 4(-3) - 3|$$

$$= |18|$$

$$= 18$$

$$(b) \ h(0) = |0^2 - 4(0) - 3| = |-3| = 3$$

$$(c) \ h(2) = h(x) = |2^2 - 4(2) - 3| = |-7| = 7$$

$$2 \text{ (a) (i) } f(2)$$

$$= |2 - 5(2)|$$

$$= |-8|$$

$$= 8$$

$$(ii) \ f(-2)$$

$$= |2 - 5x|$$

$$= |2 - 5(-2)|$$

$$= 12$$

$$(b) \ f(x) = 7$$

$$|2 - 5x| = 7$$

$$2 - 5x = \pm 7$$

$$2 - 5x = 7$$

$$5x = -5$$

$$x = -1$$

$$2 - 5x = -7$$

$$-5x = -9$$

$$x = \frac{9}{5}$$

$$3 \ g(x) = 7$$

$$|2x + 1| = 7$$

$$2x + 1 = \pm 7$$

$$2x + 1 = 7$$

$$2x = 6$$

$$x = 3$$

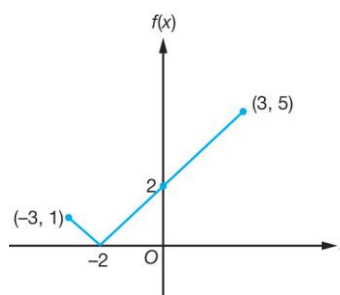
$$2x + 1 = -7$$

$$2x = -8$$

$$x = -4$$

$$4 \text{ (a) } f(x) = |x + 2|$$

$x$	-3	-2	-1	0	1	2	3
$f(x)$	1	0	1	2	3	4	5



Julat bagi  $f(x)$  ialah  $0 \leq f(x) \leq 5$ .

$$(b) \ g(x) = |2x - 5|$$

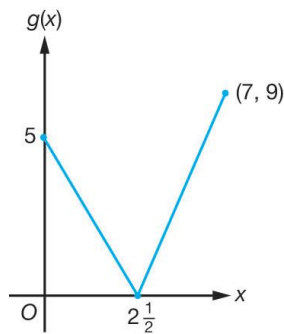
$x$	0	1	2	3	4	5	6	7
$g(x)$	5	3	1	1	3	5	7	9

$$\text{Apabila } |2x - 5| = 0$$

$$2x - 5 = 0$$

$$x = \frac{5}{2} = 2\frac{1}{2}$$

Graf menyentuh paksi- $x$  pada  $(2\frac{1}{2}, 0)$ .



Julat bagi  $g(x)$  ialah  $0 \leq g(x) \leq 9$ .

(c)  $h(x) = |3 - 2x|$

$x$	-3	-2	-1	0	1	2	3	4
$h(x)$	9	7	5	3	1	1	3	5

Pada paksi- $x$ ,  $y = 0$ ,

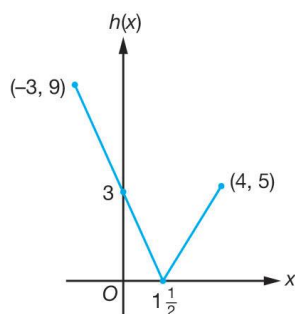
$$|3 - 2x| = 0$$

$$3 - 2x = 0$$

$$x = 1\frac{1}{2}$$

Graf menyentuh paksi- $x$  pada

$$(1\frac{1}{2}, 0)$$



Julat bagi  $h(x)$  ialah  $0 \leq h(x) \leq 9$ .

### Praktis Formatif 1.2a

1  $f(x) = |4 - 5x|$

$$g(x) = \sqrt{x - 2}$$

(a)  $fg(6) = f(\sqrt{6-2})$

$$= f(2)$$

$$= |4 - 5(2)|$$

$$= |-6|$$

$$= 6$$

(b)  $gf(2) = g(|4 - 5(2)|)$

$$= g(|-6|)$$

$$= g(6)$$

$$= \sqrt{6-2}$$

$$= \sqrt{4}$$

$$= 2$$

(c)  $f^2(0) = ff(0)$

$$= f(|4 - 5(0)|)$$

$$= f(4)$$

$$= |4 - 5(4)|$$

$$= |-16|$$

$$= 16$$

(d)  $g^2(51) = gg(51)$

$$= g(\sqrt{51-2})$$

$$= g(\sqrt{49})$$

$$= g(7)$$

$$= \sqrt{7-2}$$

$$= \sqrt{5}$$

$$= 2.236$$

2 (a)  $fg(x) = f[g(x)]$

$$= f(3x+1)$$

$$= (3x+1)^2 - 1$$

$$= 9x^2 + 6x + 1 - 1$$

$$= 9x^2 + 6x$$

$$gf(x) = g(x^2 - 1)$$

$$= 3(x^2 - 1) + 1$$

$$= 3x^2 - 3 + 1$$

$$= 3x^2 - 2$$

(b)  $fg(x) = f(1 - 3x)$

$$= (1 - 3x + 1)^2$$

$$= (2 - 3x)^2$$

$$= 4 - 12x + 9x^2$$

$$gf(x) = g[(x+1)^2]$$

$$= 1 - 3(x+1)^2$$

$$= 1 - 3(x^2 + 2x + 1)$$

$$= -2 - 3x^2 - 6x$$

$$= -3x^2 - 6x - 2$$

$$\begin{aligned}
 \text{(c) } fg(x) &= f\left(\frac{1}{x^2+2}\right) \\
 &= 2 - \left(\frac{1}{x^2+2}\right) \\
 &= \frac{2(x^2+2)-1}{x^2+2} \\
 &= \frac{2x^2+3}{x^2+2}
 \end{aligned}$$

$$\begin{aligned}
 gf(x) &= g(2-x) \\
 &= \frac{1}{(2-x)^2+2} \\
 &= \frac{1}{4-4x+x^2+2} \\
 &= \frac{1}{x^2-4x+6}
 \end{aligned}$$

$$\begin{aligned}
 \mathbf{3} \text{ (a) } f^2(x) &= ff(x) \\
 &= f(4x-3) \\
 &= 4(4x-3)-3 \\
 &= 16x-12-3 \\
 &= 16x-15
 \end{aligned}$$

$$\begin{aligned}
 \text{(b) } g^2(x) &= gg(x) \\
 &= g(x+1) \\
 &= (x+1)+1 \\
 &= x+2
 \end{aligned}$$

$$\begin{aligned}
 f^2(x) &= g^2(x) \\
 16x-15 &= x+2 \\
 15x &= 17 \\
 x &= \frac{17}{15}
 \end{aligned}$$

$$\begin{aligned}
 \mathbf{4} \quad f^2(x) &= ff(x) \\
 &= f\left(\frac{x-1}{x+1}\right) \\
 &= \frac{\left(\frac{x-1}{x+1}\right)-1}{\left(\frac{x-1}{x+1}\right)+1} \\
 &= \frac{\frac{x-1-(x+1)}{x+1}}{\frac{x-1+(x+1)}{x+1}} \\
 &= \frac{-2}{2x}
 \end{aligned}$$

$$= -\frac{1}{x}, \quad x \neq 0$$

$$\begin{aligned}
 \text{(b) } f^4(x) &= f^2 f^2(x) \\
 &= f^2\left(-\frac{1}{x}\right) \\
 &= -\frac{1}{\left(-\frac{1}{x}\right)} \\
 &= x
 \end{aligned}$$

$$\begin{aligned}
 \text{(c) } f^{12}(x) &= f^4 f^4 f^4(x) \\
 &= f^4 f^4(x) \\
 &= f^4(x) \\
 &= x
 \end{aligned}$$

$$\begin{aligned}
 \text{(d) } f^{13}(x) &= f f^{12}(x) \\
 &= f(x) \\
 &= \frac{x-1}{x+1}, \quad x \neq -1
 \end{aligned}$$

$$\begin{aligned}
 \mathbf{5} \text{ (a) } f(8) &= 4 \\
 \text{(b) } g(4) &= 16 \\
 \text{(c) } gf(8) &= g(4) = 16
 \end{aligned}$$

**6** Fungsi yang memetakan  $x$  terus kepada  $z$  ialah  $nm$ .

$$\begin{aligned}
 nm(x) &= n(3x+2) \\
 &= (3x+2)^2 - 10 \\
 &= 9x^2 + 12x + 4 - 10 \\
 &= 9x^2 + 12x - 6
 \end{aligned}$$

$$\begin{aligned}
 \mathbf{7} \text{ (a) } fg(x) &= f(x-2) \\
 &= [(x-2)+1]^2 \\
 &= (x-1)^2 \\
 &= x^2 - 2x + 1
 \end{aligned}$$

$$\begin{aligned}
 gf(x) &= g[(x+1)^2] \\
 &= (x+1)^2 - 2 \\
 &= x^2 + 2x - 1
 \end{aligned}$$

$$\begin{aligned}
 \text{(b) (i) } fg(x) &= 4 \\
 x^2 - 2x + 1 &= 4 \\
 x^2 - 2x - 3 &= 0 \\
 (x+1)(x-3) &= 0 \\
 x &= -1 \text{ atau } 3
 \end{aligned}$$

$$\begin{aligned}
 \text{(ii)} \quad gf(x) &= 7 \\
 g(x+1)^2 &= 7 \\
 (x+1)^2 - 2 &= 7 \\
 x^2 + 2x + 1 - 9 &= 0 \\
 x^2 + 2x - 8 &= 0 \\
 (x-2)(x+4) &= 0 \\
 x &= 2 \text{ atau } -4
 \end{aligned}$$

$$\begin{aligned}
 \text{(c)} \quad fg(x) &= gf(x) \\
 x^2 - 2x + 1 &= x^2 + 2x - 1 \\
 -4x &= -2 \\
 x &= \frac{1}{2}
 \end{aligned}$$

### Praktis Formatif 1.2b

$$\begin{aligned}
 \text{1 (a)} \quad fg(x) &= 3x - 2 \\
 f[g(x)] &= 3x - 2 \\
 g(x) + 2 &= 3x - 2 \\
 g(x) &= 3x - 4
 \end{aligned}$$

$$\begin{aligned}
 \text{(b)} \quad fg(x) &= \frac{2x+5}{x-2} \\
 f[g(x)] &= \frac{2x+5}{x-2} \\
 3[g(x)] + 2 &= \frac{2x+5}{x-2} \\
 3g(x) &= \frac{2x+5}{x-2} - 2 \\
 3g(x) &= \frac{2x+5-2(x-2)}{x-2} \\
 3g(x) &= \frac{9}{x-2} \\
 g(x) &= \frac{3}{x-2}, \quad x \neq 2
 \end{aligned}$$

$$\begin{aligned}
 \text{(c)} \quad fg(x) &= x^2 + 4x + 3 \\
 f[g(x)] &= x^2 + 4x + 3 \\
 [g(x)]^2 - 1 &= x^2 + 4x + 3 \\
 [g(x)]^2 &= x^2 + 4x + 3 + 1 \\
 [g(x)]^2 &= x^2 + 4x + 4 \\
 [g(x)]^2 &= (x+2)^2 \\
 g(x) &= x+2
 \end{aligned}$$

$$\begin{aligned}
 \text{2 (a)} \quad gf(x) &= \frac{3}{x-2} \\
 g[f(x)] &= \frac{3}{x-2} \\
 g(x+1) &= \frac{3}{x-2} \\
 \text{Katakan } x+1 &= u \\
 x &= u-1 \\
 g(u) &= \frac{3}{(u-1)-2} \\
 g(u) &= \frac{3}{u-3} \\
 g(x) &= \frac{3}{x-3}, \quad x \neq 3
 \end{aligned}$$

$$\begin{aligned}
 \text{(b)} \quad gf(x) &= \frac{5}{10x-1} \\
 g[f(x)] &= \frac{5}{10x-1} \\
 g\left(\frac{1}{x}\right) &= \frac{5}{10x-1} \\
 \text{Katakan } \frac{1}{x} &= u \\
 x &= \frac{1}{u} \\
 g(u) &= \frac{5}{10\left(\frac{1}{u}\right)-1} \\
 g(u) &= \frac{5u}{10-u} \\
 g(x) &= \frac{5x}{10-x}, \quad x \neq 10
 \end{aligned}$$

$$\begin{aligned}
 \text{(c)} \quad gf(x) &= 9x^2 + 9x + 2 \\
 g[f(x)] &= 9x^2 + 9x + 2 \\
 g[3x+2] &= 9x^2 + 9x + 2 \\
 \text{Katakan } 3x+2 &= u \\
 x &= \frac{u-2}{3} \\
 g(u) &= 9\left(\frac{u-2}{3}\right)^2 + 9\left(\frac{u-2}{3}\right) + 2 \\
 g(u) &= 9\left(\frac{u^2 - 4u + 4}{9}\right) + 3(u-2) + 2 \\
 g(u) &= u^2 - 4u + 4 + 3u - 6 + 2 \\
 g(u) &= u^2 - u \\
 g(x) &= x^2 - x
 \end{aligned}$$

$$\begin{aligned}
 3 \text{ (a)} \quad fg(x) &= 4x - 12 \\
 f[g(x)] &= 4x - 12 \\
 2g(x) &= 4x - 12 \\
 g(x) &= 2x - 6
 \end{aligned}$$

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

$$h[f(x)] = \frac{2x+1}{2}$$

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

Katakan  $2x = u$

$$x = \frac{u}{2}$$

$$h(u) = \frac{2\left(\frac{u}{2}\right)+1}{2}$$

$$h(u) = \frac{u+1}{2}$$

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

$$(b) \quad gf(x) = \frac{2x-1}{3}$$

$$g[f(x)] = \frac{2x-1}{3}$$

$$g(2x-2) = \frac{2x-1}{3}$$

Katakan  $2x-2 = u$

$$x = \frac{u+2}{2}$$

$$g(u) = \frac{2\left(\frac{u+2}{2}\right)-1}{3}$$

$$g(u) = \frac{u+2-1}{3}$$

$$g(u) = \frac{u+1}{3}$$

$$g(x) = \frac{x+1}{3}$$

$$fh(x) = 2x^2$$

$$f[h(x)] = 2x^2$$

$$2h(x) - 2 = 2x^2$$

$$h(x) - 1 = x^2$$

$$h(x) = x^2 + 1$$

$$(c) \quad fg(x) = x^2 + 6x + 7$$

$$f[g(x)] = x^2 + 6x + 7$$

$$[g(x)]^2 - 2 = x^2 + 6x + 7$$

$$[g(x)]^2 = x^2 + 6x + 9$$

$$[g(x)]^2 = (x+3)^2$$

$$g(x) = x+3$$

$$hf(x) = 2x^2 - 7$$

$$h[f(x)] = 2x^2 - 7$$

$$h(x^2 - 2) = 2x^2 - 7$$

Katakan  $x^2 - 2 = u$

$$x^2 = u + 2$$

$$h(u) = 2(u+2) - 7$$

$$h(u) = 2u - 3$$

$$h(x) = 2x - 3$$

### Praktis Formatif 1.2c

$$1 \quad gf(x) = g[f(x)]$$

$$= g(1-x)$$

$$= p(1-x)^2 + h$$

$$= p(1-2x+x^2) + h$$

$$= p - 2px + px^2 + h$$

$$= px^2 - 2px + p + h$$

Tetapi diberi bahawa  $gf(x) = 3x^2 - 6x + 5$ .

Dengan perbandingan,

$$p = 3 \quad \text{dan} \quad p + h = 5$$

$$3 + h = 5$$

$$h = 2$$

$$2 \text{ (a)} \quad f(x) = hx + k$$

$$f^2(x) = ff(x)$$

$$= f(hk + k)$$

$$= h(hk + k) + k$$

$$= h^2k + hk + k$$

Tetapi diberi bahawa  $f^2(x) = 81x - 16$ .

Dengan perbandingan,

$$h^2 = 81$$

$$h = \pm 9$$

$$hk + k = -16$$

$$\begin{aligned} \text{Apabila } h = 9, \\ 9k + k = -16 \\ 10k = -16 \\ k = -\frac{8}{5} \end{aligned}$$

$$\begin{aligned} \text{Apabila } h = -9, \\ -9k + k = -16 \\ -8k = -16 \\ k = 2 \end{aligned}$$

(b) Apabila  $h = -9$  dan  $k = 2$ ,

$$f(x) = -9x + 2$$

$$\begin{aligned} f(x^2) &= 3x \\ -9x^2 + 2 &= 3x \\ 9x^2 + 3x - 2 &= 0 \\ (3x-1)(3x+2) &= 0 \\ x &= \frac{1}{3} \text{ atau } -\frac{2}{3} \end{aligned}$$

### Praktis Formatif 1.3

1 Katakan  $f^{-1}(4) = y$

$$f(y) = 4$$

(a)  $3 - 2y = 4$

$$y = \frac{1}{-2}$$

$$f^{-1}(4) = -\frac{1}{2}$$

(b)  $6 - \frac{5}{y} = 4$

$$\frac{5}{y} = 2$$

$$y = \frac{5}{2}$$

$$f^{-1}(4) = \frac{5}{2}$$

(c)  $\frac{3y+2}{2y+3} = 4$

$$3y+2 = 8y+12$$

$$5y = -10$$

$$y = -2$$

$$f^{-1}(4) = -2$$

2 (a) Garis mengufuk bersilang dengan lengkung pada satu titik sahaja. Maka,

$$f(x) = \frac{2x-1}{x+2}, \quad x \neq -2 \text{ mempunyai}$$

fungsi songsang.

(b) Garis mengufuk bersilang dengan lengkung pada dua titik. Maka,

$$f(x) = x^2 - 5x + 6 \quad x \neq -2 \text{ tidak mempunyai fungsi songsang.}$$

3 (a) Katakan  $f^{-1}(x) = y$

$$f(y) = x$$

$$5 - 4y = x$$

$$4y = 5 - x$$

$$y = \frac{5-x}{4}$$

$$f^{-1}(x) = \frac{5-x}{4}$$

(b) Katakan  $g^{-1}(x) = y$

$$g(y) = x$$

$$\frac{3y-4}{2} = x$$

$$3y-4 = 2x$$

$$y = \frac{2x+4}{3}$$

$$g^{-1}(x) = \frac{2x+4}{3}$$

(c) Katakan  $h^{-1}(x) = y$

$$h(y) = x$$

$$9 - \frac{3}{y} = x$$

$$\frac{3}{y} = 9 - x$$

$$y = \frac{3}{9-x}$$

$$h^{-1}(x) = \frac{3}{9-x}, \quad x \neq 9$$

(d) Katakan  $m^{-1}(x) = y$

$$m(y) = x$$

$$\frac{2y+2}{5y-3} = x$$

$$2y+2 = 5xy-3x$$

$$2y-5xy = -3x-2$$

$$y(2-5x) = -3x-2$$

$$y = \frac{-3x-2}{2-5x}$$



$$m^{-1}(x) = \frac{3x+2}{5x-2}, \quad x \neq \frac{2}{5}$$

(e) Katakan  $n^{-1}(x) = y$

$$n(y) = x$$

$$\sqrt{2-y} = x$$

$$2-y = x^2$$

$$y = 2-x^2$$

$$n^{-1}(x) = 2-x^2$$

$$f(x) = 5-4x$$

$$f^{-1}(x) = \frac{5-x}{4}$$

$$ff^{-1}(x) = f\left(\frac{5-x}{4}\right)$$

$$= 5-4\left(\frac{5-x}{4}\right)$$

$$= 5-(5-x)$$

$$= x \text{ [Tertunjuk]}$$

$$f^{-1}f(x) = f^{-1}(5-4x)$$

$$= \frac{5-(5-4x)}{4}$$

$$= \frac{4x}{4}$$

$$= x \text{ [Tertunjuk]}$$

4 (a) Katakan  $g^{-1}(x) = y$

$$g(y) = x$$

$$\frac{y-1}{y-2} = x$$

$$y-1 = xy-2x$$

$$y-xy = 1-2x$$

$$y(1-x) = 1-2x$$

$$y = \frac{1-2x}{1-x}$$

$$g^{-1}(x) = \frac{1-2x}{1-x}, \quad x \neq 1$$

(b)  $gg^{-1}(x) = g\left(\frac{1-2x}{1-x}\right)$

$$= \left(\frac{1-2x}{1-x}\right) - 1$$

$$= \frac{\left(\frac{1-2x}{1-x}\right) - 2}{1-x}$$

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

$$= \frac{-x}{1-x} = \frac{-x}{1-x} = \frac{-x}{1-x} = \frac{-x}{1-x}$$

$$= \frac{-x}{-1}$$

$$= x \text{ [Tertunjuk]}$$

$$g^{-1}g(x) = g^{-1}\left(\frac{x-1}{x-2}\right)$$

$$= \frac{1-2\left(\frac{x-1}{x-2}\right)}{1-\left(\frac{x-1}{x-2}\right)}$$

$$= \frac{x-2-2x+2}{x-2-2x+2}$$

$$= \frac{x-2}{x-2-x+1}$$

$$= \frac{x-2}{x-2}$$

$$= \frac{-x}{-1}$$

$$= x \text{ [Tertunjuk]}$$

5 (a) Katakan  $f^{-1}(x) = y$

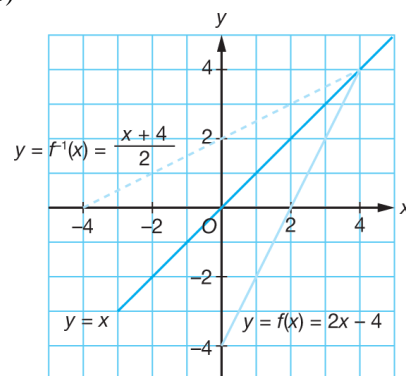
$$f(y) = x$$

$$2y-4 = x$$

$$y = \frac{x+4}{2}$$

$$f^{-1}(x) = \frac{x+4}{2}$$

(b)



Graf bagi  $f^{-1}$  ialah pantulan bagi graf  $f$  pada garis lurus  $y = x$ .

(c) (i) Domain bagi  $f(x)$  ialah  $0 \leq x \leq 4$ .

Julat bagi  $f(x)$  ialah  $-4 \leq f(x) \leq 4$ .

(ii) Domain bagi  $f^{-1}(x)$  ialah

$$-4 \leq x \leq 4.$$

Julat bagi  $f^{-1}(x)$  ialah

$$0 \leq f^{-1}(x) \leq 4.$$

*Kesimpulan*

✚ Domain bagi  $f^{-1}(x)$  ialah julat bagi  $f(x)$ .

✚ Julat bagi  $f^{-1}(x)$  ialah domain bagi  $f(x)$ .

6 (a)  $f(x) = \frac{3x-1}{x-2}, x \neq 2$

Tetapi diberi bahawa  $x \neq h$ .  
Dengan perbandingan,  $h = 2$ .

(b)  $f^2(x) = ff(x) \quad f(x) = \frac{3x-1}{x-2}$

$$\begin{aligned} &= f\left(\frac{3x-1}{x-2}\right) \\ &= \frac{3\left(\frac{3x-1}{x-2}\right)-1}{\left(\frac{3x-1}{x-2}\right)-2} \\ &= \frac{3(3x-1)-(x-2)}{x-2} \\ &= \frac{3x-1-2(x-2)}{x-2} \\ &= \frac{9x-3-x+2}{3x-1-2x+4} \\ &= \frac{8x-1}{x+3}, x \neq -3 \end{aligned}$$

(c) Katakan  $f^{-1}(x) = y$

$$f(y) = x$$

$$\frac{3y-1}{y-2} = x$$

$$3y-1 = xy-2x$$

$$3y-xy = 1-2x$$

$$y(3-x) = 1-2x$$

$$y = \frac{1-2x}{3-x}$$

$$f^{-1}(x) = \frac{2x-1}{x-3}, x \neq 3$$

7  $f(x) = \frac{4}{x}$   
 $g(x) = 2x+3$

(a) Katakan  $f^{-1}(x) = y$

$$f(y) = x$$

$$\frac{4}{y} = x$$

$$y = \frac{4}{x}$$

$$f^{-1}(x) = \frac{4}{x}, x \neq 0$$

(b) Katakan  $g^{-1}(x) = y$

$$g(y) = x$$

$$2y+3 = x$$

$$y = \frac{x-3}{2}$$

$$g^{-1}(x) = \frac{x-3}{2}$$

(c)  $f^{-1}g^{-1} = f^{-1}\left(\frac{x-3}{2}\right)$

$$= \frac{4}{x-3}$$

$$= \frac{8}{x-3}, x \neq 3$$

(d)  $g^{-1}f^{-1}(x) = g^{-1}\left(\frac{4}{x}\right)$

$$= \frac{4}{x}-3$$

$$= \frac{4-3x}{2x}, x \neq 0$$

8  $f(x) = 1-2x$

$$g(x) = \frac{x+2}{x-2}$$

(a) Katakan  $f^{-1}(x) = y$

$$f(y) = x$$

$$1-2y = x$$

$$y = \frac{1-x}{2}$$

$$f^{-1}(x) = \frac{1-x}{2}$$

(b) Katakan  $g^{-1}(x) = y$   
 $g(y) = x$   
 $\frac{y+2}{y-2} = x$   
 $y+2 = xy-2x$   
 $xy-y = 2x+2$   
 $y(x-1) = 2x+2$   
 $y = \frac{2x+2}{x-1}$

$$g^{-1}(x) = \frac{2x+2}{x-1}, \quad x \neq 1$$

(c)  $g^{-1}f^{-1} = g^{-1}\left(\frac{1-x}{2}\right)$   
 $= \frac{2\left(\frac{1-x}{2}\right)+2}{\left(\frac{1-x}{2}\right)-1}$   
 $= \frac{3-x}{\frac{1-x-2}{2}}$   
 $= \frac{6-2x}{-x-1}$   
 $= \frac{2x-6}{x+1}, \quad x \neq -1$

(d)  $fg(x) = f\left(\frac{x+1}{x-2}\right)$   
 $= 1-2\left(\frac{x+1}{x-2}\right)$   
 $= \frac{x-2-2(x+1)}{x-2}$   
 $= \frac{x-2-2x-4}{x-2}$   
 $= \frac{-x-6}{x-2}$   
 $fg(x) = \frac{x+6}{2-x}, \quad x \neq 2$

(e)  $y = \frac{x+6}{2-x}$   
 $y(2-x) = x+6$   
 $2y-xy = x+6$   
 $x+xy = -2y-6$   
 $x(1+y) = 2y-6$   
 $x = \frac{2y-6}{y+1}$   
 $(fg)^{-1}(x) = \frac{2x-6}{x+1}, \quad x \neq -1$

Ya,  $(fg)^{-1}(x) = g^{-1}f^{-1}(x)$

9 (a)  $f^2(x) = ff(x)$   
 $= f(2x-1)$   
 $= 2(2x-1)-1$   
 $= 4x-3$

Katakan  $f^{-1}(x) = y$   
 $f(y) = x$   
 $2y-1 = x$   
 $y = \frac{x+1}{2}$   
 $f^{-1}(x) = \frac{x+1}{2}$

(b)  $(f^{-1})^2(x) = f^{-1}f^{-1}(x)$   
 $= f^{-1}\left(\frac{x+1}{2}\right)$   
 $= \frac{\left(\frac{x+1}{2}\right)+1}{2}$   
 $= \frac{x+1+2}{4}$   
 $= \frac{x+3}{4}$

$f^2(x) = ff(x)$   
 $= f(2x-1)$   
 $= 2(2x-1)-1$   
 $= 4x-3$

Katakan  $y = 4x-3$   
 $x = \frac{y+3}{4}$   
 $(f^2)^{-1}(x) = \frac{x+3}{4}$

Maka,  $(f^{-1})^2(x) = (f^2)^{-1}(x)$   
 [Tertunjuk]

10 Katakan  $f^{-1}(x) = y$   
 $f(y) = x$   
 $\frac{y+p}{y-5} = x$   
 $y+p = xy-5x$   
 $xy-y = p+5x$

$$y(x-1) = p + 5x$$

$$y = \frac{5x+p}{x-1}$$

$$f^{-1}(x) = \frac{5x+p}{x-1}, \quad x \neq 1$$

Tetapi diberi bahawa  $f^{-1}(x) = \frac{qx+6}{x-1}$ ,

$$x \neq 1.$$

Maka, dengan perbandingan,  $q = 5$  dan  $p = 6$ .

11 (a) Katakan  $f^{-1}(x) = y$

$$f(y) = x$$

$$4y + h = x$$

$$y = \frac{x-h}{4}$$

$$f^{-1}(x) = \frac{x-h}{4}$$

Tetap diberi bahawa  $f^{-1}(x) = \frac{x+5}{k}$ .

Maka, dengan perbandingan,  
 $h = -5$  dan  $k = 4$ .

(b)  $f^{-1}f(b) = b^2 - 2$

$$b = b^2 - 2$$

$$b^2 - b - 2 = 0$$

$$(b-2)(b+1) = 0$$

$$b = 2 \text{ atau } -1$$

12 (a) Katakan  $f^{-1}(x) = y$

$$f(y) = x$$

$$\frac{3y-1}{y} = x$$

$$3y-1 = xy$$

$$3y - xy = 1$$

$$y(3-x) = 1$$

$$y = \frac{1}{3-x}$$

$$f^{-1}(x) = \frac{1}{3-x}, \quad x \neq 3$$

Tetapi diberi bahawa  $f^{-1}(x) = \frac{1}{m-x}$ .

Maka, dengan perbandingan,  $m = 3$ .

(b)  $f^{-1}f(k^2+2) = (k+2)^2 + 2$

$$k^2 + 2 = k^2 + 4k + 4 + 2$$

$$4k + 4 = 0$$

$$k = -1$$

13 (a) Katakan  $y = \frac{3x+8}{4}$

$$4y = 3x+8$$

$$x = \frac{4y-8}{3}$$

$$f(x) = \frac{4x-8}{3}$$

(b) Katakan  $y = \frac{2x+1}{x+4}$

$$y(x+4) = 2x+1$$

$$xy+4y = 2x+1$$

$$xy-2x = 1-4y$$

$$x(y-2) = 1-4y$$

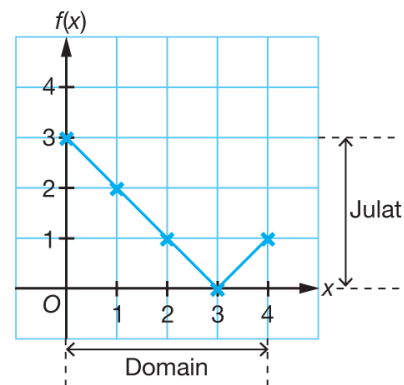
$$x = \frac{1-4y}{y-2}$$

$$g(x) = \frac{1-4x}{x-2}, \quad x \neq 2$$

### Praktis Sumatif 1

1 (a)

$x$	0	1	2	3	4
$f(x)$	3	2	1	0	1



(b) Julat yang sepadan bagi  $f(x)$  ialah  $0 \leq f(x) \leq 3$ .

2  $fg: x \rightarrow x^2 + 1$

$$f[g(x)] = x^2 + 1$$

$$3g(x) - 7 = x^2 + 1$$

$$3g(x) = x^2 + 8$$

$$g(x) = \frac{x^2 + 8}{3}$$

$$3 \quad gf : x \rightarrow x^2 + 1$$

$$g[f(x)] = x^2 + 1$$

$$g(x-2) = x^2 + 1$$

Katakan  $x-2 = u$

$$x = u + 2$$

$$g(u) = (u+2)^2 + 1$$

$$g(u) = u^2 + 4u + 4 + 1$$

$$g(u) = u^2 + 4u + 5$$

$$g(x) = x^2 + 4x + 5$$

$$4 \quad g(x) = px + q$$

$$g^2 : x \rightarrow 49x - 32$$

$$g^2(x) = 49x - 32$$

$$g[g(x)] = 49x - 32$$

$$g(px + q) = 49x - 32$$

$$p(px + q) + q = 49x - 32$$

$$p^2x + pq + q = 49x - 32$$

Dengan perbandingan,

$$p^2 = 49 \quad \text{dan} \quad pq + q = -32$$

$$p = 7 \quad (\text{Diberi } p > 0)$$

Apabila  $p = 7$ ,  $7q + q = -32$

$$8q = -32$$

$$q = -4$$

$$5 \quad \text{(a) Katakan } f^{-1}(x) = y$$

$$f(y) = x$$

$$2y - 5 = x$$

$$y = \frac{x+5}{2}$$

$$f^{-1}(x) = \frac{x+5}{2}$$

$$f^{-1}g(x)$$

$$= f^{-1}[g(x)]$$

$$= f^{-1}\left(\frac{3x}{x+3}\right)$$

$$= \frac{\left(\frac{3x}{x+3}\right) + 5}{2}$$

$$= \frac{3x + 5(x+3)}{2(x+3)}$$

$$= \frac{8x+15}{2(x+3)}$$

$$= \frac{8x+15}{2x+6}, x \neq -3$$

$$\text{(b) } g[f(x)]$$

$$= g(2x-5)$$

$$= \frac{3(2x-5)}{(2x-5)+3}$$

$$= \frac{6x-15}{2x-2}$$

$$f^2(4) = ff(4)$$

$$= f(2 \times 4 - 5)$$

$$= f(3)$$

$$= 2 \times 3 - 5$$

$$= 1$$

$$gf(-k) = f^2(4)$$

$$\frac{6(-k)-15}{2(-k)-2} = 1$$

$$-6k - 15 = -2k - 2$$

$$-4k = 13$$

$$k = -\frac{13}{4}$$

$$6 \quad \text{(a) Katakan } f^{-1}(x) = y$$

$$f(y) = x$$

$$p - qy = x$$

$$y = \frac{p-x}{q}$$

$$f^{-1}(x) = \frac{p-x}{q}$$

$$\text{(b) } f(2) = 7$$

$$p - 2q = -7 \quad \dots (1)$$

$$p = 2q - 7$$

$$f^{-1}(8) = -1$$

$$\frac{p-8}{q} = -1$$

$$p - 8 = -q$$

$$p = 8 - q \quad \dots (2)$$

Gantikan (1) ke dalam (2) :

$$2q - 7 = 8 - q \quad p = 8 - 5$$

$$3q = 15 \quad p = 3$$

$$q = 5$$

7 (a) Katakan  $f^{-1}(x) = y$   
 $f(y) = x$   
 $2y - 3 = x$   
 $y = \frac{x+3}{2}$   
 $f^{-1}(x) = \frac{x+3}{2}$

$$f^{-1}g(x) = f^{-1}\left(\frac{x}{2} + 2\right)$$

$$= \frac{\frac{x}{2} + 2 + 3}{2}$$

$$= \frac{x+10}{4}$$

(b)  $hg(x) = 2x + 4$   
 $h[g(x)] = 2x + 4$   
 $h\left(\frac{x}{2} + 2\right) = 2x + 4$

Katakan  $\frac{x}{2} + 2 = u$   
 $\frac{x}{2} = u - 2$   
 $x = 2u - 4$   
 $h(u) = 2(u - 4) + 4$   
 $h(u) = 2u - 8 + 4$   
 $h(u) = 2u - 4$   
 $h(x) = 2x - 4$

8 (a)  $f(y) = ay + b$   
 $g(y) = \frac{5}{3y - b}$

$$f(3) = -2 \qquad g(3) = 1$$

$$3a + b = -2 \qquad \frac{5}{3(3) - b} = 1$$

$$3a + 4 = -2 \qquad 9 - b = 5$$

$$a = -2 \qquad b = 4$$

(b) Fungsi yang memetakan  $x$  kepada  $y$  ialah  $f^{-1}(x)$ .

Telah dicari bahawa  $f(y) = -2y + 4$ .

Katakan  $w = -2y + 4$ ,

$$y = \frac{4 - w}{2}$$

$$f^{-1}(x) = \frac{4 - x}{2}$$

(c) Maka, fungsi yang memetakan  $x$  terus kepada  $z$  ialah  $gf^{-1}(x)$ .

$$gf^{-1}(x)$$

$$= g\left(\frac{4-x}{2}\right)$$

$$= \frac{5}{3\left(\frac{4-x}{2}\right) - 4}$$

$$= \frac{10}{3(4-x) - 8}$$

$$= \frac{10}{12 - 3x - 8}$$

$$= \frac{10}{4 - 3x}, \quad x \neq \frac{4}{3}$$

9 (a)  $gf(x) = g(h - x^2)$   
 $= k(h - x^2) + 2$   
 $= hk - kx^2 + 2$   
 $= hk + 2 - kx^2$

Tetapi diberi bahawa  $gf(x) = 14 - 3x^2$ .

Dengan perbandingan,  $k = 3$

$$3h + 2 = 14$$

$$h = 4$$

(b) Katakan  $g^{-1}(-13) = y$   
 $g(y) = -13$   
 $3y + 2 = -13$   
 $y = -5$   
 $g^{-1}(-13) = -5$

$$f(t) = -5$$

$$4 - t^2 = -5$$

$$t^2 = 9$$

$$t = \pm 3$$

10 (a)  $f(x) = \frac{hx}{x-3}, \quad x \neq 3$

Katakan:

$$f^{-1}(x) = y.$$

$$f(y) = x$$

$$\frac{hy}{y-3} = x$$

$$hy = x(y-3)$$

$$hy = xy - 3x$$

$$xy - hy = 3x$$

$$y(x-h) = 3x$$

$$y = \frac{3x}{x-h}$$

$$f^{-1}(x) = \frac{3x}{x-h}$$

Tetapi diberi bahawa

$$f^{-1}(x) = \frac{kx}{x-2}$$

Dengan perbandingan,  
 $k = 3$  dan  $h = 2$

(b) Apabila  $h = 2$ ,  $f^{-1}(x) = \frac{3x}{x-2}$

$$gf^{-1}(x) = -5x$$

$$g\left(\frac{3x}{x-2}\right) = -5x$$

$$\frac{1}{\left(\frac{3x}{x-2}\right)} = -5x$$

$$\frac{x-2}{3x} = -5x$$

$$x-2 = -15x^2$$

$$15x^2 + x - 2 = 0$$

$$(3x-1)(5x+2) = 0$$

$$x = \frac{1}{3} \text{ atau } x = -\frac{2}{5}$$

11 (a)  $fg(x) = f[g(x)]$

$$= f\left(\frac{2+x}{4-3x}\right)$$

$$= \frac{2\left(\frac{2+x}{4-3x}\right) - 1}{\left(\frac{2+x}{4-3x}\right) - 3}$$

$$= \frac{2(2+x) - (4-3x)}{4-3x}$$

$$= \frac{4+2x-4+3x}{2+x-3(4-3x)}$$

$$= \frac{4+2x-4+3x}{2+x-12+9x}$$

$$= \frac{5x}{10x-10}$$

$$= \frac{x}{2x-2}, x \neq 1$$

(b) Katakan  $y = \frac{x}{2x-2}$

$$2xy - 2y = x$$

$$2xy - x = 2y$$

$$x(2y-1) = 2y$$

$$x = \frac{2y}{2y-1}$$

$$(fg)^{-1} = \frac{2x}{2x-1}, x \neq \frac{1}{2}$$

12 (a)  $fg : x \rightarrow x^2 + 1$

$$f[g(x)] = x^2 + 1$$

$$2g(x) + 2 = x^2 + 1$$

$$2g(x) = x^2 - 1$$

$$g(x) = \frac{x^2 - 1}{2}$$

Maka,  $g(3) = \frac{3^2 - 1}{2} = 4$

Gantikan  $x$  dalam  
 $f(x) = 2x + 2$   
 dengan  $g(x)$ .

(b)  $f : x \rightarrow 2 - x$

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

Katakan  $f^{-1}(x) = y$

$$f(y) = x$$

$$2 - y = x$$

$$y = 2 - x$$

$$\therefore f^{-1}(x) = 2 - x$$

$$gf^{-1} : x \rightarrow 3x^2 - 12x + 13$$

$$g[f^{-1}(x)] = 3x^2 - 12x + 13$$

$$g(2-x) = 3x^2 - 12x + 13$$

$$a + b(2-x)^2 = 3x^2 - 12x + 13$$

$$a + b(4 - 4x + x^2) = 3x^2 - 12x + 13$$

$$a + 4b - 4bx + bx^2 = 3x^2 - 12x + 13$$

Dengan perbandingan,

$$b = 3$$

$$a + 4b = 13$$

$$a + 4(3) = 13$$

$$a = 1$$

13 (a)  $fg : x \rightarrow x + 2$

$$f[g(x)] = x + 2$$

$$a[g(x)] + b = x + 2$$

$$a(2x-1) + b = x + 2$$

$$2ax - a + b = x + 2$$

Dengan perbandingan,

$$2a = 1$$

$$a = \frac{1}{2}$$

$$\begin{aligned}
 -a+b &= 2 \\
 -\frac{1}{2}+b &= 2 \\
 b &= \frac{5}{2}
 \end{aligned}$$

(b) Katakan  $h^{-1}(x) = y$

$$\begin{aligned}
 h(y) &= x \\
 \frac{1}{y-3} &= x \\
 1 &= xy-3x \\
 xy &= 1+3x \\
 y &= \frac{1+3x}{x} \\
 \therefore h^{-1}(x) &= \frac{1+3x}{x}
 \end{aligned}$$

$$\begin{aligned}
 h^{-1}g(x) &= 1 \\
 h^{-1}[g(x)] &= 1 \\
 \frac{1+3g(x)}{g(x)} &= 1 \\
 1+3g(x) &= g(x) \\
 2g(x) &= -1 \\
 2(2x-1) &= -1 \\
 4x-2 &= -1 \\
 4x &= 1 \\
 x &= \frac{1}{4}
 \end{aligned}$$

14 (a)  $fg(x) = 5x-3$   
 $f[g(x)] = 5x-3$   
 $g(x)+14 = 5x-3$   
 $g(x) = 5x-17$

(b) Katakan  $h^{-1}(x) = y$

$$\begin{aligned}
 h(y) &= x \\
 \frac{y-1}{y+3} &= x \\
 y-1 &= x(y+3) \\
 y-1 &= xy+3x \\
 y-xy &= 3x+1 \\
 y(1-x) &= 3x+1 \\
 y &= \frac{3x+1}{1-x} \\
 h^{-1}(x) &= \frac{3x+1}{1-x}
 \end{aligned}$$

$$g(x) = h^{-1}(x)$$

$$5x-17 = \frac{3x+1}{1-x}$$

$$(5x-17)(1-x) = 3x+1$$

$$5x-5x^2-17+17x = 3x+1$$

$$5x^2-19x+18 = 0$$

$$(5x-9)(x-2) = 0$$

$$x = \frac{9}{5} \text{ atau } 2$$

15 (a)  $g(x) = \frac{2}{x-4}, x \neq k$

Penyebut  $\neq 0$

$$x-4 \neq 0$$

$$x \neq 4$$

Dengan perbandingan,

$$k = 4$$

(b)  $f(x) = \frac{5}{2}x - h$

Katakan:

$$f^{-1}(x) = y$$

$$f(y) = x$$

$$\frac{5}{2}y - h = x$$

$$\frac{5}{2}y = x + h$$

$$y = \frac{2(x+h)}{5}$$

$$f^{-1}(x) = \frac{2(x+h)}{5} = \frac{2x+2h}{5}$$

Tetapi diberi bahawa

$$f^{-1}(x) = \frac{mx+6}{5}$$

Dengan perbandingan,

$$m = 2 \quad \text{dan} \quad 2h = 6 \Rightarrow h = 3$$

(c) Apabila  $h = 3$ ,

$$f(x) = \frac{5}{2}x - 3$$

$$gf(p+1) = p+2$$

$$g[f(p+1)] = p+2$$

$$g\left[\frac{5}{2}(p+1)-3\right] = p+2$$

$$g\left(\frac{5}{2}p + \frac{5}{2} - 3\right) = p+2$$

$$g\left(\frac{5}{2}p - \frac{1}{2}\right) = p+2$$

Gantikan  $x$  dalam

$$f(x) = \frac{5}{2}x - 3$$

dengan  $(p+1)$ .



$$\frac{2}{\left(\frac{5}{2}p - \frac{1}{2}\right) - 4} = p + 2$$

$$\frac{2}{\left(\frac{5}{2}p - \frac{9}{2}\right)} = p + 2$$

$$\frac{4}{(5p - 9)} = p + 2$$

$$4 = (p + 2)(5p - 9)$$

$$4 = 5p^2 + p - 18$$

$$5p^2 + p - 22 = 0$$

$$(5p + 11)(p - 2) = 0$$

$$p = -\frac{11}{5} \text{ atau } p = 2$$

16 (a)  $f f^{-1}(p^2) = f(p - 5)$

$$p^2 = -2(p - 5) + 5$$

$$p^2 = -2p + 10 + 5$$

$$p^2 + 2p - 15 = 0$$

$$(p - 3)(p + 5) = 0$$

$$p = 3 \text{ atau } -5$$

(b) Katakan:

$$f^{-1}(x) = y$$

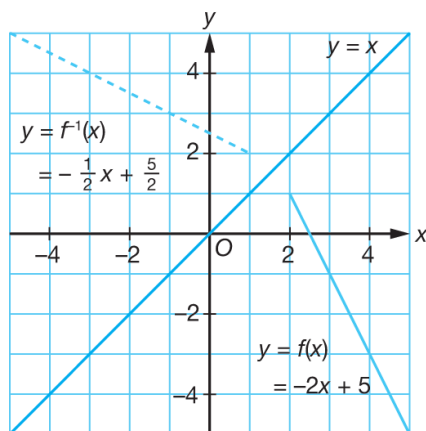
$$f(y) = x$$

$$-2y + 5 = x$$

$$2y = 5 - x$$

$$y = \frac{5 - x}{2}$$

$$f^{-1}(x) = -\frac{1}{2}x + \frac{5}{2}$$



Graf  $f^{-1}$  ialah pantulan bagi graf  $f$  pada garis lurus  $y = x$ .

(c) Julat bagi  $f(x)$  ialah  $-5 \leq x \leq 1$ .

Domain bagi  $f^{-1}(x)$

ialah  $-5 \leq f^{-1}(x) \leq 1$ .

Julat bagi  $f^{-1}(x)$  ialah  $2 \leq f^{-1}(x) \leq 5$ .

Domain bagi  $f^{-1}(x)$  ialah julat bagi  $f(x)$ .

Julat bagi  $f^{-1}(x)$  ialah domain bagi  $f(x)$ .