

Penyelesaian Lengkap

PRAKTIS 1

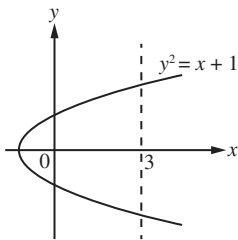
Kertas 1

Bahagian A

1 (a) $y^2 = x + 1$
 $y^2 = (3) + 1$
 $y^2 = 4$
 $y = -2, y = 2$

Kodomain/Codomain: $-2 \leq y \leq 2$

(b)



Graf ini bukan satu fungsi. Apabila ujian garis mencancang digunakan, garis itu memotong graf pada dua titik.

The graph is not a function. When a vertical line test is used, the line cuts the graph at two points.

2 (a) $f(x) = |7 - 2x|$

Apabila/When $x = w$, $f(x) = 0$,

$$7 - 2w = 0$$

$$w = 3.5$$

Apabila/When $x = 4$,

$$f(4) = |7 - 2(4)|$$

$$= |-1|$$

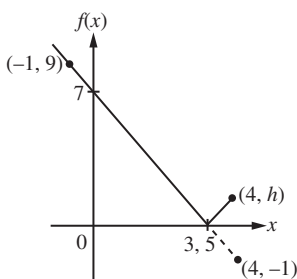
$$= 1$$

$$h = 1$$

(b) $f(-1) = |7 - 2(-1)|$

$$= |7 + 2|$$

$$= 9$$



Julat/Range: $0 \leq x \leq 9$

3 (a) $g(2) = 4$

$$h(2) + k = 4$$

$$2h + k = 4 \dots \textcircled{1}$$

$$g(8) = 7$$

$$h(8) + k = 7$$

$$8h + k = 7 \dots \textcircled{2}$$

$$\textcircled{2} - \textcircled{1}: 6h = 3$$

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

Daripada/From $\textcircled{1}$,

$$2\left(\frac{1}{2}\right) + k = 4$$

$$k = 3$$

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

$$g(x) = x$$

$$\frac{1}{2}x + 3 = x$$

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

$$x = 6$$

4 (a) $18 + 2x - x^2 = 10$

$$x^2 - 2x - 8 = 0$$

$$(x + 2)(x - 4) = 0$$

$$x + 2 = 0 \quad \text{atau/or} \quad x - 4 = 0$$

$$x = -2$$

$$x = 4$$

$$\therefore w = -2$$

(b) Daripada rajah/From the diagram,

$$1 + |x - 2| > 0$$

Apabila/When $x = 0$,

$$k = 1 + 2 = 3$$

$$m = 2$$

$$1 + |n - 2| = 5$$

$$|n - 2| = 4$$

$$n - 2 = 4$$

$$n = 6$$

$$\therefore k = 3, m = 2, n = 6$$

5 (a) $h(x) = |5 + 3x|$

$$h(-6) = |5 + 3(-6)|$$

$$= |5 - 18|$$

$$= |-13|$$

$$= 13$$

(b) $|5 + 3x| = 4$

$$5 + 3x = -4 \quad \text{atau/or} \quad 5 + 3x = 4$$

$$3x = -9 \quad \text{atau/or} \quad 3x = -1$$

$$x = -3 \quad \text{atau/or} \quad x = -\frac{1}{3}$$

6 $f(x) = (w - 1)x$

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

$$gf(x) = 4x + 5$$

$$gf[f^{-1}(x)] = 4\left(\frac{x}{w - 1}\right) + 5$$

$$g(x) = \frac{4x}{w-1} + 5 \dots \textcircled{1}$$

Diberi/Given $g^{-1}(x) = 2x - 10$,

maka/thus $g(x) = \frac{x+10}{2}$

$$g(x) = \frac{x}{2} + 5 \dots \textcircled{2}$$

Bandungkan ① dan ②/Compare ① and ②,

$$\frac{4}{w-1} = \frac{1}{2}$$

$$8 = w - 1$$

$$w = 9$$

7 (a) $f(x) = 2x - 9$
 $fg(x) = 2g(x) - 9$
 $2g(x) - 9 = 6x^2 - 4x - 7$
 $2g(x) = 6x^2 - 4x + 2$
 $g(x) = 3x^2 - 2x + 1$
 $\therefore g : x \rightarrow 3x^2 - 2x + 1$

(b) (i) $g(x) = ex + h$
 $g^2(x) = e(ex + h) + h$
 $= e^2x + eh + h$

Diberi/Given $g : x^2 \rightarrow 16x - 10$

Bandungan pekali,

Compare coefficients,

$$e^2 = 16$$

$$e = 4$$

$$eh + h = -10$$

$$(4)h + h = -10$$

$$5h = -10$$

$$h = -2$$

(ii) $g^3(x) = g^2[g(x)]$
 $= 16[g(x)] - 10$
 $= 16(4x - 2) - 10$
 $= 64x - 32 - 10$
 $= 64x - 42$

8 (a) $f(x) = \frac{1}{2}x + 5, fg(x) = 2x + 1$

$$fg(x) = \frac{1}{2}g(x) + 5$$

$$\frac{1}{2}g(x) + 5 = 2x + 1$$

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

$$g(x) = 4x - 8$$

$$gf(x) = g\left(\frac{1}{2}x + 5\right)$$

$$= 4\left(\frac{1}{2}x + 5\right) - 8$$

$$= 2x + 12$$

(b) $h(x) = \frac{2x+1}{3}, hk(x) = 2x - 1$

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

$$2k(x) + 1 = 6x - 3$$

$$2k(x) = 6x - 4$$

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

9 (a) $f(g(x)) = 13 - 6x$
 $3g(x) - 2 = 13 - 6x$
 $3g(x) = 15 - 6x$
 $g(x) = 5 - 2x$
 $gf(x) = 5 - 2f(x)$
 $= 5 - 2(3x - 2)$
 $= 9 - 6x$

(b) $gf(k^2 + 1) = k - 2$
 $9 - 6(k^2 + 1) = k - 2$
 $9 - 6k^2 - 6 = k - 2$
 $0 = 6k^2 + k - 5$
 $(6k - 5)(k + 1) = 0$
 $6k - 5 = 0, k + 1 = 0$
 $k = \frac{5}{6}, k = -1$

10 (a) Biar/Let $y = \frac{4x+1}{3x-2}$
 $y(3x-2) = 4x+1$
 $3xy - 2y = 4x+1$
 $3xy - 4x = 2y+1$
 $x(3y-4) = 2y+1$
 $x = \frac{2y+1}{3y-4}$
 $f^{-1}(x) = \frac{2x+1}{3x-4}, x \neq \frac{4}{3}$
 $f^{-1}(2) = \frac{2(2)+1}{3(2)-4}$
 $= \frac{5}{2}$

(b) Biar/Let $y = px + q$
 $y - q = px$

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

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

$$h^{-1}(-6) = -1$$

$$\frac{-6-q}{p} = -1$$

$$-p + q = -6 \dots \textcircled{1}$$

$$h^{-1}(18) = 5$$

$$\frac{18-q}{p} = 5$$

$$5p + q = 18 \dots \textcircled{2}$$

$$\textcircled{2} - \textcircled{1}: 6p = 24$$

$$p = 4$$

Daripada/From ①,

$$-(4) + q = -6 \dots \textcircled{1}$$

$$q = -2$$

Maka/Thus,

$$h(x) = 4x - 2$$

$$h(3) = 4(3) - 2$$

$$= 10$$

Bahagian B

11 (a) (i) $u(x) = 2.5x - 85$

$$(ii) \quad u(x) = 0$$

$$2.5x - 85 = 0$$

$$x = \frac{85}{2.5}$$

$$x = 34$$

$$(iii) \text{ Biar/Let } y = 2.5x - 85$$

$$x = \frac{y + 85}{2.5}$$

$$u^{-1}(x) = \frac{x + 85}{2.5}$$

$$u^{-1}(120) = \frac{120 + 85}{2.5}$$

$$= 82$$

Bilangan pinggan nasi ayam yang perlu dijual untuk mendapat keuntungan sebanyak RM120 ialah 82.

The number of plates of chicken rice that must be sold in order to secure a profit of RM120 is 82.

$$(b) \quad g(x) = p + qx$$

$$g^2(x) = p + q(p + qx)$$

$$= p + pq + q^2x$$

$$g^4(x) = p + pq + q^2(p + pq + q^2x)$$

$$= p + pq + pq^2 + pq^3 + q^4x$$

Maka/Thus,

$$q^4 = 16$$

$$q = 2$$

$$p + pq + pq^2 + pq^3 = -45$$

$$p + p(2) + p(2)^2 + p(2)^3 = -45$$

$$15p = -45$$

$$p = -3$$

12 (a) Biar/Let

$$y = 9 - 2x$$

$$2x = 9 - y$$

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

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

$$(b) \quad g^f(x) = 5 - 6x$$

$$g[f^{-1}(x)] = 5 - 6f^{-1}(x)$$

$$g(x) = 5 - 6\left(\frac{9 - x}{2}\right)$$

$$= 5 - (27 - 3x)$$

$$= 3x - 22$$

$$(c) \quad g(x) = 3x - 22$$

$$g(g(x)) = 3g(x) - 22$$

$$g^2(x) = 3(3x - 22) - 22$$

$$= 9x - 88$$

$$g^2(6) = 9(6) - 88$$

$$= -34$$

Kertas 2

Bahagian A

$$1 (a) \quad g(x) = mx + n$$

$$g(f(x)) = 6x - 10$$

$$mf(x) + n = 6x - 10$$

$$m(2x - 6) + n = 6x - 10$$

$$2mx - 6m + n = 6x - 10$$

Bandungkan pekali x ,
Compare coefficients of x ,
 $2m = 6$
 $m = 3$

Bandungkan pemalar,
Compare constants,
 $-6m + n = -10$
 $-6(3) + n = -10$
 $n = 8$

(b) (i) Biar/Let

$$y = \frac{15}{p - x}$$

$$py - xy = 15$$

$$-xy = 15 - py$$

$$x = \frac{py - 15}{y}$$

$$\therefore f^{-1}(x) = \frac{px - 15}{x}, x \neq 0$$

$$(b) (ii) \quad f^{-1}(3) = g(1 - p)$$

$$\frac{p(3) - 15}{(3)} = 4 + (1 - p)$$

$$p - 5 = 5 - p$$

$$2p = 10$$

$$p = 5$$

2 (a) Biar/Let

$$y = 6x - 4$$

$$x = \frac{y + 4}{6}$$

$$f^{-1}(x) = \frac{x + 4}{6}$$

(b) Biar/Let

$$f^{-1}g(x) = \frac{g(x) + 4}{6}$$

$$= \frac{\left(\frac{x}{2} + 3\right) + 4}{6}$$

$$= \frac{\frac{x}{2} + 7}{6}$$

$$= \frac{x + 14}{12}$$

$$(c) \quad hf(x) = 12x + 6$$

$$hf[f^{-1}(x)] = 12f^{-1}(x) + 6$$

$$h(x) = 12\left(\frac{x + 4}{6}\right) + 6$$

$$= 2x + 8 + 6$$

$$= 2x + 14$$

3 (a) Biar/Let

$$y = 4x + 3$$

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

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

$$fg(x) = 12x - 3$$

$$fg[g^{-1}(x)] = 12g^{-1}(x) - 3$$

$$\begin{aligned}
 f(x) &= 12\left(\frac{x-3}{4}\right) - 3 \\
 &= 3x - 9 - 3 \\
 &= 3x - 12
 \end{aligned}$$

(b) Biar/Let

$$\begin{aligned}
 gf(x) &= 4[f(x)] + 3 \\
 &= 4(3x - 12) + 3 \\
 &= 12x - 48 + 3 \\
 &= 12x - 45
 \end{aligned}$$

(c)

$$\begin{aligned}
 3fg(x+2) &= gf(x) \\
 3[12(x+2) - 3] &= 12x - 45 \\
 3[12x + 24 - 3] &= 12x - 45 \\
 3[12x + 21] &= 12x - 45 \\
 12x + 21 &= 4x - 15 \\
 8x &= -36 \\
 x &= -\frac{9}{2}
 \end{aligned}$$

Bahagian B

4 (a) (i) (a) Fungsi yang metakan set D kepada set C ialah $g^{-1}(x)$.

The function that maps set D to set C is $g^{-1}(x)$.

Biar/Let

$$y = 4x - 3$$

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

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

$$\begin{aligned}
 \text{(b)} \quad hg(x) &= 8x - 5 \\
 hg(g^{-1}(x)) &= 8g^{-1}(x) - 5 \\
 h(x) &= 8\left(\frac{x+3}{4}\right) - 5 \\
 &= 2x + 6 - 5 \\
 &= 2x + 1
 \end{aligned}$$

(ii)

$$\begin{aligned}
 gh(x) &= 6x + 7 \\
 g(2x + 1) &= 6x + 7 \\
 4(2x + 1) - 3 &= 6x + 7 \\
 8x + 4 - 3 &= 6x + 7 \\
 2x &= 6 \\
 x &= 3
 \end{aligned}$$

(b) (i) Biar/Let

$$y = \frac{2-x}{5x+1}$$

$$y(5x+1) = 2-x$$

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

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

$$x(5y+1) = 2-y$$

$$x = \frac{2-y}{5y+1}$$

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

(ii) $g^2(x) = g[g(x)] = g[g^{-1}(x)] = x$

$$g^3(x) = \frac{2-x}{5x+1}$$

$$g^4(x) = x$$

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