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13.

Latihan Soal 2.1

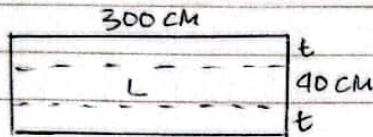
13. $f(x) = \sqrt{x^2 - 2x + 5}$

$$\begin{aligned} D(f) &= x^2 - 2x + 5 > 0 \\ &= (x-1)^2 + 4 > 0 \\ &= (x-1)^2 > -4 \end{aligned}$$

$$D(f) = (-\infty, \infty)$$

$$\begin{aligned} R(f) &= \text{Fungsi terata di dalam akar} \\ &= [0, +\infty) \end{aligned}$$

17.



$$\begin{aligned} L(t) &= 300 \times (40 - 2t) \\ &= 12000 - 600t \end{aligned}$$

$$\begin{aligned} D(L) &= 12000 - 600t > 0 \\ &= 120 - 6t > 0 \\ &= 120 > 6t \\ &= t < \frac{120}{6} \Rightarrow t < 20 \end{aligned}$$

$$D(L) = (0, 20)$$

Latihan Soal 2.2

10. a). $f(x) = 3x, g(x) = x^2 + 1$

$$\begin{aligned} 1. (f+g)(x) &= 3x + x^2 + 1 \\ &= x^2 + 3x + 1 \end{aligned}$$

$$D(f+g) = (-\infty, +\infty)$$

$$\begin{aligned} 2. (f \cdot g)(x) &= (3x) \cdot (x^2 + 1) \\ &= 3x^3 + 3x \end{aligned}$$

$$D(f \cdot g) = (-\infty, +\infty)$$

$$\begin{aligned} 3. (f \circ g) &= f(x^2 + 1) = 3x \\ &= 3(x^2 + 1) \\ &= 3x^2 + 3 \end{aligned}$$

$$D(f \circ g) = (-\infty, +\infty)$$

b). $f(x) = \sqrt{x-1}, g(x) = x+2$

$$1. (f+g)(x) = \sqrt{x-1} + x+2$$

$$\begin{aligned} D(f+g) &= x-1 \geq 0 \\ &= x \geq 1 \\ &= [1, +\infty) \end{aligned}$$

$$\begin{aligned} 2. (f \cdot g)(x) &= (\sqrt{x-1})(x+2) \\ &= x\sqrt{x-1} + 2\sqrt{x-1} \end{aligned}$$

$$\begin{aligned} D(f \cdot g) &= x-1 \geq 0 \\ &= x \geq 1 \\ &= [1, +\infty) \end{aligned}$$

$$\begin{aligned} 3. (f \circ g)(x) &= f(x+2) = \sqrt{x-1} \\ &= \sqrt{x+2} - 1 \\ &= \sqrt{x+1} \end{aligned}$$

$$\begin{aligned} D(f \circ g) &= x+1 \geq 0 \\ &= x \geq -1 \\ &= [-1, +\infty) \end{aligned}$$



13. $f(x) = \sqrt{x^2 - 1}$, dan $g(x) = \frac{2}{x}$

a). $(f \cdot g)(x) = (\sqrt{x^2 - 1}) \left(\frac{2}{x}\right)$
 $= \frac{2}{x} \sqrt{x^2 - 1}$

$D(f \cdot g) = x \neq 0$

$= x^2 - 1 \geq 0$

$= (x+1)(x-1)$

$\Rightarrow x = -1; x = 1$



$D = (-\infty, -1] \cup [1, +\infty)$

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

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

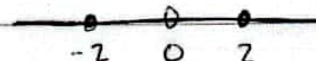
$= \sqrt{\frac{4}{x^2} - 1}$

$D(f \circ g) = \frac{4}{x^2} - 1 \geq 0$

$= 4 - x^2 \geq 0$

$\Rightarrow (x+2)(-x+2)$

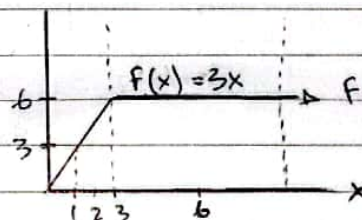
$x = -2 \cup x = 2 \cup x \neq 0$



$D(f \circ g) = [-2, 0) \cup (0, 2]$

Latihan Soal 2.3

13. $f(x) = \begin{cases} 3x, & 0 \leq x \leq 2, \\ b, & x > 2, \end{cases}$
 $x = c (c \geq 0)$



• LS Segitiga untuk

$0 \leq x \leq 2$

• LS Trapezium untuk

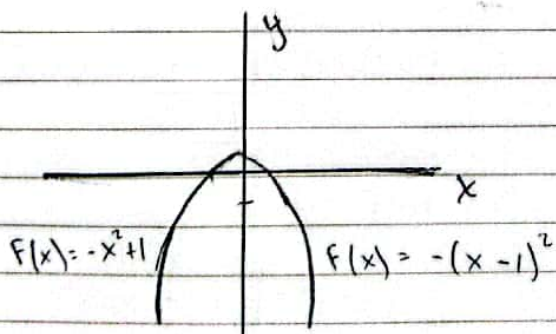
$x > 2$

$L_1 = \frac{c \times b^2}{2} = 3c, 0 \leq x \leq 2$

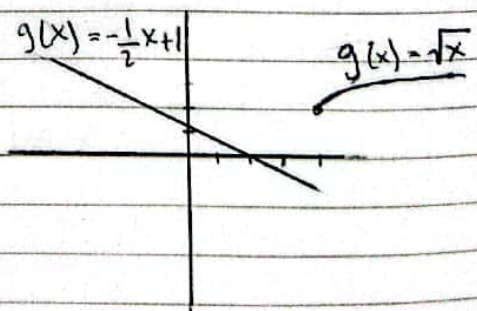
$L_2 = \frac{(c + (c-2)) \times b^2}{2} = (2c-2)3$
 $= 6c-6, x > 2$

$L(c) = \begin{cases} 3c, & 0 \leq c \leq 2 \\ 6c-6, & x > 2 \end{cases}$

18. a). $f(x) = \begin{cases} -x^2 + 1, & x \leq 0 \\ -(x-1)^2, & x > 0 \end{cases}$



b). $f(x) = \begin{cases} -\frac{1}{2}x + 1, & x < 4 \\ \sqrt{x}, & x \geq 4 \end{cases}$



Latihan Soal 2.4

8. $F(x) = 2x^2 + 8x - 2, x \geq 0$

a). $R(f) = 2x^2 + 8x - 2$
 $= 2(0)^2 + 8(0) - 2$
 $= -2$

$R(f) = [-2, +\infty)$

b). $y = 2x^2 + 8x - 2$

$y + 2 = 2x^2 + 8x$

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

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

$\frac{y+2}{2} + 4 = (x+2)^2$

$\frac{y+10}{2} = (x+2)^2$

$\sqrt{\frac{y+10}{2}} = x+2$

$\sqrt{\frac{y+10}{2}} - 2 = x \Rightarrow y = \sqrt{\frac{x+10}{2}} - 2$

$D = \frac{x+10}{2} > 0 \quad D = (-10, +\infty)$

$= x+10 > 0$

$x > -10$

15. $F(t) = 3t^2 - 5t + 6$

$y = 3t^2 - 5t + 6$

$y - 6 = 3t^2 - 5t$

$\frac{y-6}{3} = t^2 - \frac{5}{3}t$

$\frac{y-6}{3} = \left(t - \frac{5}{6}\right)^2 - \frac{25}{36}$

$\frac{y-6}{3} + \frac{25}{36} = \left(t - \frac{5}{6}\right)^2$

$\sqrt{\frac{y-6}{3} + \frac{25}{36}} = t - \frac{5}{6}$

$\sqrt{\frac{y-6}{3} + \frac{25}{36}} + \frac{5}{6} = t$

$F(t) = \sqrt{\frac{t-6}{3} + \frac{25}{36}} + \frac{5}{6}$

$\frac{t-6}{3} + \frac{25}{36} = \frac{1}{36}$

$\frac{t-6}{3} = -\frac{24}{36}$

$t-6 = -\frac{24}{12}$

$t-6 = -2$

$t = -2+6$

$t = 4$

$F(t_0) = 3t^2 - 5t + 6$

$= 3(4)^2 - 5(4) + 6$

$= 3(16) - 20 + 6$

$= 48 - 14$

$= 34$

