Penyelesaian Lengkap

Praktis 3

Praktis Formatif

1 (a) $\int 6x^2 + 10x - 7\,dx = 2x^3 + 5x^2 - 7x$

(b) $\int 20x^3 + 6x + 1\,dx = 5x^4 + 3x^2 + x$

2 (a) $\int 6 + \frac{36}{x^5}dx = 3\int 2 + \frac{12}{x^5}dx$

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

$= 6x - \frac{9}{x^4}$

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

$= \frac{12x^2 - 4x - 6x^2}{(3x-1)^2}$

$= \frac{6x^2 - 4x}{(3x-1)^2}$

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

$\int \frac{6x(3x-2)}{(3x-1)^2}dx = 3\int \frac{2x(3x-2)}{(3x-1)^2}dx$

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

$= \frac{6x^2}{3x-1}$

3 (a) $R(x) = -50x^2 + 600x$

$R'(x) = -100x + 600$

(b) $R(x) = \int 300 - 50x\,dt$

$= \int \frac{1}{2}(600 - 100x)\,dt$

$= \frac{1}{2}[-50x^2 + 600x]$

$= -25x^2 + 300x$

$R(3) = -25(3)^2 + 300(3) = 675$

Pendapatan/*Revenue* $= 675 \times$ RM5.50

= RM3 712.50

4 $f'(x)\int f'(x)dx = (4x^3 - 6x^2)(x^4 - 2x^3)$

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

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

5 $y = \frac{2x-6}{x} = 2 - 6x^{-1}$

(a) $\frac{dy}{dx} = 6x^{-2}$

(b) $4 + \int\left(\frac{dy}{dx}\right)dx = 0$

$4 + 2 - 6x^{-1} = 0$

$6 = 6x^{-1}$

$x = 1$

6 $\frac{3f(x)}{\int g(x)dx} = \frac{3f(x)}{f(x)}$

$= 3$

7 (a) $P_B'(5) = 2[2.72^{1.2(5)} - 2(5)]$

$= 789.9$

≈ 790

(b) $P_B(5) = 2\left[\frac{5}{6}(2.72^{1.2(5)}) - (5)^2 + 1\,495\right]$

$= 3\,614.9$

$\approx 3\,615$ orang/*people*

8 (a) $\int 24x\,dx = 12x^2 + c$

(b) $\int 3x^2 + 4x\,dx = x^3 + 2x^2 + c$

(c) $\int \frac{2}{x^4}dx = \int 2x^{-4}\,dx$

$= \frac{2x^{-4+1}}{-3} + c$

$= -\frac{2}{3x^3} + c$

(d) $\int (x+2)(2x^4 - 1)\,dx = \int 2x^5 - x + 4x^4 - 2\,dx$

$= \frac{2x^6}{6} - \frac{x^2}{2} + \frac{4x^5}{5} - 2x + c$

$= \frac{x^6}{3} + \frac{4x^5}{5} - \frac{x^2}{2} - 2x + c$

(e) $\int \frac{x^2 + 3x + 2}{x+2}\,dx = \int \frac{(x+2)(x+1)}{x+2}\,dx$

$= \int x + 1\,dx$

$= \frac{x^2}{2} + x + c$

9 (a) $\frac{dy}{dx} = 3x^2 + x - 2$

$y = \int 3x^2 + x - 2\,dx$

$= x^3 + \frac{x^2}{2} - 2x + c$

Pada/*At* $P(2, 15)$, $15 = (2)^3 + \frac{(2)^2}{2} - 2(2) + c$

$c = 9$

$y = x^3 + \frac{x^2}{2} - 2x + 9$

(b) $f(x) = \int 2x + 9\,dx$

$= x^2 + 9x + c$

$f(3) = 21$

$(3)^2 + 9(3) + c = 21$

$c = -15$

$f(x) = x^2 + 9x - 15$

(c) $g(t) = \frac{(t-1)(5t-1)}{t^3(t-1)}$

$= 5t^{-2} - t^{-3}$

$y = \int 5t^{-2} - t^{-3}\,dt$

$= \frac{5t^{-1}}{(-1)} - \frac{t^{-2}}{(-2)} + c$

$= -\frac{5}{t} + \frac{1}{2t^2} + c$

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

$c = \frac{15}{2}$

$y = \frac{15}{2} - \frac{5}{t} + \frac{1}{2t^2}$

10 $\frac{ds}{dt} = t^2 + 9$

$s = \int t^2 + 9\ dt$

$= \frac{t^3}{3} + 9t + c$

$4 = \frac{(3)^3}{3} + 9(3) + c$

$c = -32$

$s = \frac{t^3}{3} + 9t - 32$

$s = \frac{(10)^3}{3} + 9(10) - 32$

$= 391\frac{1}{3}$ m

11 $y = \int kx^2 + 2x\ dx$

$= \frac{kx^3}{3} + x^2 + c$

Pada/*At* $A(1, 6)$,

$6 = \frac{k}{3} + 1 + c$

$15 = k + 3c$

$k + 3c = 15 \ldots$ ①

Pada/*At* $B(-2, 0)$,

$0 = \frac{k(-2)^3}{3} + (-2)^2 + c$

$0 = -8k + 12 + 3c$

$8k - 3c = 12 \ldots$ ②

① + ②: $9k = 27$

$k = 3$

$3c = 15 - 3$

$c = 4$

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

$y = x^3 + x^2 + 4$

12 (a) $\int_1^2 \left(\sqrt{x} + \frac{1}{\sqrt{x}}\right) dx$

$= \int_1^2 (x^{\frac{1}{2}} + x^{-\frac{1}{2}})\ dx$

$= \left[\frac{x^{\frac{3}{2}}}{\frac{3}{2}} + \frac{x^{\frac{1}{2}}}{\frac{1}{2}}\right]$

$= \left[\frac{2x^{\frac{3}{2}}}{3} + 2x^{\frac{1}{2}}\right]_1^2$

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

$= 2.0474$

(b) $\int_{-2}^{-1} \left(\frac{(4 - x)(3 - x)}{x^5}\right) dx$

$= \int_{-2}^{-1} \left(\frac{12 - 7x + x^2}{x^5}\right) dx$

$= \int_{-2}^{-1} (12x^{-5} - 7x^{-4} + x^{-3})\ dx$

$= \left[-3x^{-4} + \frac{7x^{-3}}{3} - \frac{x^{-2}}{2}\right]_{-2}^{-1}$

$= \left[-\frac{3}{x^4} + \frac{7}{3x^3} - \frac{1}{2x^2}\right]_{-2}^{-1}$

$= \left(-\frac{3}{(-1)^4} + \frac{7}{3(-1)^3} - \frac{1}{2(-1)^2}\right) - \left(-\frac{3}{(-2)^4} + \frac{7}{3(-2)^3} - \frac{1}{2(-2)^2}\right)$

$= -5\frac{11}{48}$

13 (a) $\int_a^b [f(x) - g(x)]\ dx = \int_a^b f(x)\ dx - \int_a^b g(x)\ dx$

$= 5 - 2$

$= 3$

(b) $\int_c^a f(x)\ dx = -\int_a^c f(x)\ dx = -[\int_a^b f(x)\ dx + \int_b^c f(x)\ dx]$

$= -(5 + 8)$

$= -13$

(c) $\int_a^b [g(x) + 3]\ dx = \int_a^b g(x)\ dx + \int_a^b 3\ dx$

$= 2 + 3b - 3a$

(d) $\int_b^a [f(x) + kx]\ dx = 25$

$\int_b^a f(x)\ dx + \int_b^a kx\ dx = 25$

$-\int_a^b f(x)\ dx + k\left[\frac{x^2}{2}\right]_4^1 = 25$

$-5 + k\left(\frac{(1)^2 - (4)^2}{2}\right) = 25$

$-\frac{15}{2}k = 30$

$k = -4$

14 (a) $A = \int_2^4 x^3 - 4x^2 + x + 10\ dx$

$= \left[\frac{x^4}{4} - \frac{4x^3}{3} + \frac{x^2}{2} + 10x\right]_2^4$

$= \left[\frac{(4)^4}{4} - \frac{4(4)^3}{3} + \frac{(4)^2}{2} + 10(4)\right] - \left[\frac{(2)^4}{4} - \frac{4(2)^3}{3} + \frac{(2)^2}{2} + 10(2)\right]$

$= 11\frac{1}{3}$ unit²/*units*²

(b) $y = x^2 - 4x$

$5 = x^2 - 4x$

$x^2 - 4x - 5 = 0$

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

$x = -1, 5$

$A = \int_{-1}^0 x^2 - 4x\ dx + \left|\int_0^3 x^2 - 4x\ dx\right| + \int_4^5 x^2 - 4x\ dx$

$= \left[\frac{x^3}{3} - 2x^2\right]_{-1}^0 + \left|\left[\frac{x^3}{3} - 2x^2\right]_0^3\right| + \left[\frac{x^3}{3} - 2x^2\right]_4^5$

$= 0 - \left[\frac{(-1)^3}{3} - 2(-1)^2\right] + \left|\left[\frac{(3)^3}{3} - 2(3)^2\right] - 0\right| + \left[\frac{(5)^3}{3} - 2(5)^2\right] - \left[\frac{(4)^3}{3} - 2(4)^2\right]$

$= 0 - \left(-2\frac{1}{3}\right) + |-9| + \left(-8\frac{1}{3}\right) - \left(-10\frac{2}{3}\right)$

$= 13\frac{2}{3}$ unit²/*units*²

15 (a) $A = \int_1^4 \frac{1}{3}(y^2 - 1)\ dy$

$= \frac{1}{3}\left[\frac{y^3}{3} - y\right]_1^4$

$= \frac{1}{3}\left[\left(\frac{4^3}{3} - 4\right) - \left(\frac{1^3}{3} - 1\right)\right]_1^4$

$= 6$ unit^2/*units*^{2}

(b) $A = \int_{-1}^{0} 2y^3 - y^2 - 6y\, dy + \left|\int_0^1 2y^3 - y^2 - 6y\, dy\right|$

$= \left[\frac{2y^4}{4} - \frac{y^3}{3} - 3y^2\right]_{-1}^{0} + \left|\left[\frac{2y^4}{4} - \frac{y^3}{3} - 3y^2\right]_0^1\right|$

$= 0 - \left[\frac{(-1)^4}{2} - \frac{(-1)^3}{3} - 3(-1)^2\right]$

$+ \left|\left[\frac{(1)^4}{2} - \frac{(1)^3}{3} - 3(1)^2\right] - 0\right|$

$= 2\frac{1}{6} + \left|-2\frac{5}{6}\right|$

$= 5$ unit^2/*units*^{2}

16 (a) $x = 4x - x^2$

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

$x^2 - 3x = 0$

$x = 0, 3$

$A = \int_0^3 4x - x^2 - x\, dy$

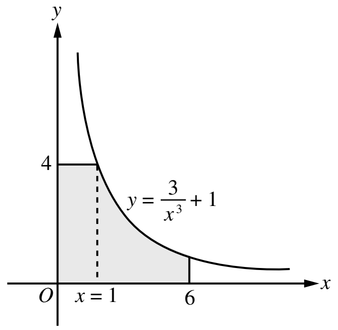
$= \int_0^3 3x - x^2\, dy$

$= \left[\frac{3}{2}x^2 - \frac{1}{3}x^3\right]_0^3$

$= \frac{3}{2}(3)^2 - \frac{1}{3}(3)^3 - 0$

$= 4.5$ unit^2/*units*^{2}

(b)



$4 = \frac{3}{x^3} + 1$

$3x^3 = 3$

$x^3 = 1$

$x = 1$

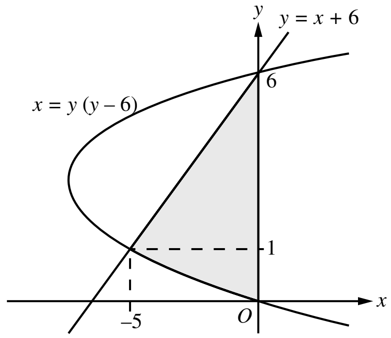
$A = (1)(4) + \int_1^6 3x^{-3} + 1\, dx$

$= 4 + \left[\frac{3x^{-3+1}}{(-2)} + x\right]_1^6$

$= 4 + \left[-\frac{3}{2(6)^2} + (6)\right] - \left[-\frac{3}{2(1)^2} + (1)\right]$

$= 10\frac{11}{24}$ unit^2/*units*^{2}

17



$y^2 - 6y = y - 6$

$y^2 - 7y + 6 = 0$

$(y - 1)(y - 6) = 0$

$y = 1, 6$

$x = 1 - 6$

$= -5$

$A = \left|\int_0^1 y^2 - 6y\, dy\right| + \frac{1}{2}(5)(5)$

$= \left|\left[\frac{y^3}{3} - 3y^2\right]_0^1\right| + \frac{25}{2}$

$= \left|\left[\frac{1^3}{3} - 3(1)^2\right] - 0\right| + \frac{25}{2}$

$= 15\frac{1}{6}$ unit^2/*units*^{2}

18 (a) $V = \pi\int_0^3 (x^2 + 2)^2\, dx$

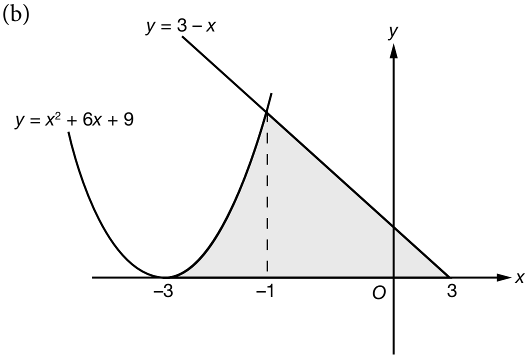
$= \pi\int_0^3 x^4 + 4x^2 + 4\, dx$

$= \pi\left[\frac{x^5}{5} + \frac{4x^3}{3} + 4x\right]_0^3$

$= \pi\left(\frac{3^5}{5} + \frac{4(3)^3}{3} + 4(3) - 0\right)$

$= 96.6\pi$ unit^3/*units*^{3}

(b)



$x^2 + 6x + 9 = 0$

$(x + 3)^2 = 0$

$x = -3$

$x^2 + 6x + 9 = 3 - x$

$x^2 + 7x + 6 = 0$

$(x + 6)(x + 1) = 0$

$x = -1, -6$

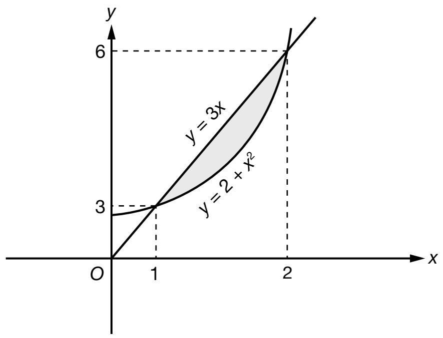
$3 - x = 0$

$x = 3$

$$V = \pi\int_{-3}^{-1}(x^2 + 6x + 9)^2\,dx + \int_{-1}^{3}\pi(3 - x)^2\,dx$$
$$= \pi\int_{-3}^{-1}x^4 + 12x^3 + 54x^2 + 108x + 81\,dx$$
$$+ \pi\int_{-1}^{3}9 - 6x + x^2\,dx$$
$$= \pi\left[\frac{x^5}{5} + 3x^4 + 18x^3 + 54x^2 + 81x\right]_{-3}^{-1}$$
$$+ \pi\left[9x - 3x^2 + \frac{x^3}{3}\right]_{-1}^{3}$$
$$= \pi\left[\frac{(1)^5}{5} + 3(-1)^4 + 18(-1)^3 + 54(-1)^2 + 81(-1)\right]$$
$$- \pi\left[\frac{(-3)^5}{5} + 3(-3)^4 + 18(-3)^3 + 54(-3)^2\right.$$
$$\left.+ 81(-3)\right] + \pi\left[9(3) - 3(3)^2 + \frac{(3)^3}{3}\right] - \pi[9(-1)$$
$$\left.- 3(-1)^2 + \frac{(-1)^3}{3}\right]$$
$$= 6\frac{2}{5}\pi + 21\frac{1}{3}\pi$$
$$= 27\frac{11}{15}\pi \text{ unit}^3/\textit{units}^3$$

19 (a) $V = \pi\int_{2}^{10}y - 1\,dy$
$$= \pi\left[\frac{y^2}{2} - y\right]_{2}^{10}$$
$$= \pi\left[\left(\frac{10^2}{2} - 10\right) - \left(\frac{2^2}{2} - 2\right)\right]$$
$$= 40\pi \text{ unit}^3/\textit{units}^3$$

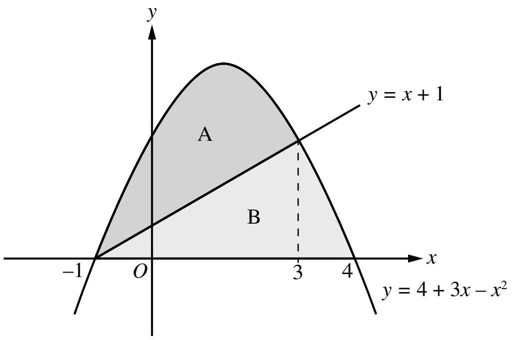
(b)



$x = 1, y = 3$
$x = 2, y = 6$
$3x = y$
$x^2 = \dfrac{y^2}{9}$
$x^2 = y - 2$
$$V = \pi\int_{3}^{6}y - 2 - \frac{y^2}{9}\,dy$$
$$= \pi\left[\frac{y^2}{2} - 2y - \frac{y^3}{27}\right]_{3}^{6}$$
$$= \pi\left[\frac{(6)^2}{3} - 2(6) - \frac{(6)^3}{27}\right] - \pi\left[\frac{(3)^2}{3} - 2(3) - \frac{(3)^3}{27}\right]$$
$$= \frac{1}{2}\pi \text{ unit}^3/\textit{units}^3$$

20 $V = \pi\int_{2}^{k}64x^{-2}\,dx$
$$= 64\pi\left[\frac{x^{-1}}{(-1)}\right]_{2}^{k}$$
$$V = 64\pi\left[-\frac{1}{x}\right]_{2}^{k}$$
$$= 64\pi\left[-\frac{1}{k} - \left(-\frac{1}{2}\right)\right]$$
$$= 64\pi\left(\frac{1}{2} - \frac{1}{k}\right)$$
$$V = 32\pi - \frac{64\pi}{k}$$
$$k \to \infty, \frac{1}{k} \approx 0$$
$$\therefore\ V \approx 32\pi \text{ unit}^3/\textit{units}^3$$

21



$$-(x^2 - 3x - 4) = 0$$
$$(x - 4)(x + 1) = 0$$
$$x = -1, 4$$
$$x + 1 = 4 + 3x - x^2$$
$$x^2 - 2x - 3 = 0$$
$$(x - 3)(x + 1) = 0$$
$$x = -1, 3$$

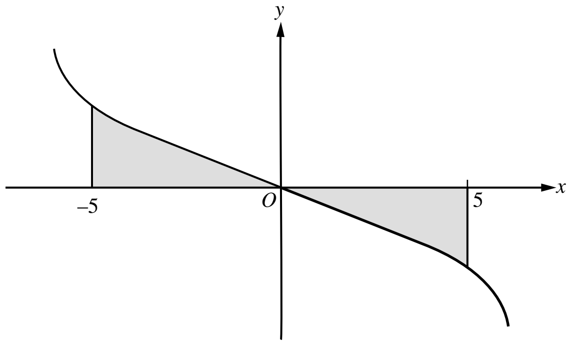
$$A_A = \int_{-1}^{3}4 + 3x - x^2 - (x + 1)\,dx$$
$$= \int_{-1}^{3}3 + 2x - x^2\,dx$$
$$= \left[3x + x^2 - \frac{1}{3}x^3\right]_{-1}^{3}$$
$$= \left[3(3) + (3)^2 - \frac{1}{3}(3)^3\right] - \left[3(-1) + (-1)^2 - \frac{1}{3}(-1)^3\right]$$
$$= 10\frac{2}{3} \text{ unit}^2/\textit{units}^2$$

$$A_B = \int_{-1}^{3}x + 1\,dx + \int_{3}^{4}4 + 3x - x^2\,dx$$
$$= \left[\frac{x^2}{2} + x\right]_{-1}^{3} + \left[4x + \frac{3x^2}{2} - \frac{x^3}{3}\right]_{3}^{4}$$
$$= \left[\frac{(3)^2}{2} + (3)\right] - \left[\frac{(-1)^2}{2} + (-1)\right] +$$
$$\left[4(4) + \frac{3(4)^2}{2} - \frac{(4)^3}{3}\right] - \left[4(3) + \frac{3(3)^2}{2} - \frac{(3)^3}{3}\right]$$
$$= 10\frac{1}{6} \text{ unit}^2/\textit{units}^2$$

$$A : B = 10\frac{2}{3} : 10\frac{1}{6}$$
$$= 64 : 61$$

22 (a) $p = 5$
$q + 1 = -5$
$q = -6$

(b)



23 $\frac{dh}{dt} = 0.56t \text{ cm s}^{-1}$

$h = \int 0.56t\, dt$

$= 0.28t^2 + c$

$t = 0.\ h = 0,\ \therefore\ c = 0$

$h = 0.28t^2$

$28 = 0.28t^2$

$t^2 = 100$

$t = 10$

24 (a) $(1 - y^2)^2 = 1 - 2y^2 + y^4$

$(0.8 - 0.5y^2)^2 = 0.64 - 0.8y^2 + 0.25y^4$

$V = \pi\int_{-0.2}^{0.2}(1 - 2y^2 + y^4) - (0.64 - 0.8y^2 + 0.25y^4)\, dy$

$= \pi\int_{-0.2}^{0.2} 0.36 - 1.2y^2 + 0.75y^4\, dy$

$= \pi[0.36y - 0.4y^3 + 0.15y^5]_{-0.2}^{0.2}$

$= \pi[0.36(0.2) - 0.4(0.2)^3 + 0.15(0.2)^5]$

$- \pi[0.36(-0.2) - 0.4(-0.2)^3 + 0.15(-0.2)^5]$

$= 0.1377\pi \text{ cm}^3$

(b) Jisim/*Mass* $= 4.51 \times 0.1377\pi$

$= 1.9513$ g

Harga/*Price* = RM153.49 × 1.9513

= RM299.51

Praktis Sumatif

Kertas 1

1 $\int_m^2 (2x + 3)\, dx = -8$

$[x^2 + 3x]_m^2 = -8$

$[2^2 + 3(2)] - [m^2 + 3m] = -8$

$10 - m^2 - 3m = -8$

$m^2 + 3m - 18 = 0$

$(m + 6)(m - 3) = 0$

$m = 3$ (–6 tidak diterima)

(–6 *not accepted*)

2 (a) $\int_m^5 3f(t)dt = -3\int_5^m f(t)dt$

$= -3\left(\frac{7}{3}\right)$

$= -7$

(b) $\int_5^m [4 - f(t)]dt = 7$

$[4t]_5^m - \int_5^m f(t)dt = 7$

$4m - 20 = 7 + \frac{7}{3}$

$4m = \frac{28}{3} + 20$

$m = 7\frac{1}{3}$

3 (a) Nilai yang tidak mungkin/*The impossible value for* $n = 1$

(b) $\int \frac{3}{(3x - 2)^n}\, dx = \int 3(3x - 2)^{-n}\, dx$

$= \frac{3(3x - 2)^{1-n}}{(1 - n)(3)} + c$

$= \frac{(3x - 2)^{1-n}}{(1 - n)} + c$

$\therefore\ a = \frac{1}{1 - n}$

$1 - n = \frac{1}{a}$

$n = 1 - \frac{1}{a}$

$n = \frac{a - 1}{a}$

4 $\int_0^b f(x)\, dx = 20$

$\int_0^a f(x)\, dx + \int_a^b f(x)\, dx = 20$

$-x + 3x = 20$

$2x = 20$

$x = 10$

$\int_a^b f(x)\, dx = 3(10)$

$= 30$ unit^2/*units*^{2}

Kertas 2

1 $y = 2x^4\sqrt{4x - 3}$

$\frac{dy}{dx} = \sqrt{4x - 3}\frac{d}{dx}(2x^4) + (2x^4)\frac{d}{dx}\sqrt{4x - 3}$

$= \sqrt{4x - 3}(8x^3) + \frac{4x^4}{\sqrt{4x - 3}}$

$= \frac{(4x - 3)(8x^3) + 4x^4}{\sqrt{4x - 3}}$

$= \frac{32x^4 - 24x^3 + 4x^4}{\sqrt{4x - 3}}$

$= \frac{36x^4 - 24x^3}{\sqrt{4x - 3}}$

$\int \frac{3x^4 - 2x^3}{\sqrt{4x - 3}}\, dx = \frac{1}{12}\int \frac{36x^4 - 24x^3}{\sqrt{4x - 3}}\, dx$

$= \frac{1}{12}(2x^4\sqrt{4x - 3})$

$= \frac{x^4}{6}\sqrt{4x - 3}$

2 $\frac{dB}{dt} = 70 - 10t$

$B = 70t - 5t^2 + c$

$120 = 70(2) - 5(2)^2 + c$

$c = 120 - 120$

$= 0$

$B = 70t - 5t^2$

(a) $B = 70(10) - 5(10)^2$

$= 200$

(b) B maksimum apabila/*is msaximum when* $\frac{dB}{dt} = 0$

$70 - 10t = 0$

$t = 7$

B maksimum/*is maximum* $= 70(7) - 5(7)^2$

$= 245$

Pendapatan/*Income* $= 245 \times$ RM25

= RM6 125

3 $m_t = kx - 6$

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

$m_n = -\frac{1}{kx - 6}$

Pada/*At* $(2, -5)$, $m_n = \frac{1}{2}$

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

$2k = -2 + 6$

$k = 2$

$\frac{dy}{dx} = 2x - 6$

$y = \int 2x - 6\, dx$

$= x^2 - 6x + c$

$-5 = (2)^2 - 6(2) + c$

$c = -5 + 8$

$= 3$

$\therefore y = x^2 - 6x + 3$

4 (a) Pada titik pegun/*At the stationary points,*

$f'(x) = 0$

$3x^2 + mx + n = 0$

$x = 1$, $3 + m + n = 0$ … ①

$x = -3$, $27 - 3m + n = 0$ … ②

① – ②: $-24 + 4m = 0$

$m = 6$

$n = -3 - 6$

$= -9$

(b) $f'(x) = 3x^2 + 6x - 9$

$f(x) = \int 3x^2 + 6x - 9\, dx$

$= x^3 + 3x^2 - 9x + c$

$-3 = (1)^3 + 3(1)^2 - 9(1) + c$

$c = 2$

$f(x) = x^3 + 3x^2 - 9x + 2$

5 (a) $A = \int_0^a \left(\frac{x}{a}\right)^3 dx$

$= \frac{1}{a^3}\int_0^a x^3\, dx$

$= \frac{1}{a^3}\left[\frac{x^4}{4}\right]_0^a$

$= \frac{1}{a^3}\left(\frac{a^4}{4} - 0\right)$

$= \frac{a}{4}$

(b) $B = \int_a^b \left(\frac{a}{x}\right)^3 dx$

$= a^3\int_0^a x^{-3}\, dx$

$= a^3\left[\frac{x^{-2}}{-2}\right]_a^b$

$= a^3\left\{\left[-\frac{1}{2b^2}\right] - \left[-\frac{1}{2a^2}\right]\right\}$

$= a^3\left(\frac{b^2 - a^2}{2a^2b^2}\right)$

$= \frac{ab^2 - a^3}{2b^2}$

(c) $A = \frac{a}{4}, B = \frac{a}{2}\left(1 - \frac{a^2}{b^2}\right)$

$B = 2\left[\frac{a}{4}\left(1 - \frac{a^2}{b^2}\right)\right]$

$= 2A\left(1 - \frac{a^2}{b^2}\right)$

$\frac{B}{2A} = 1 - \frac{a^2}{b^2}$

$0 < a < b$, $\therefore 1 - \frac{a^2}{b^2} < 1$

$\frac{B}{2A} < 1$

$\frac{B}{2} < A$

$A > \frac{1}{2}B$ (Tertunjuk/*Shown*)

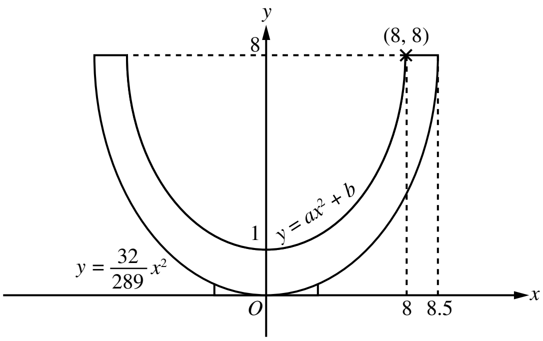
6 (a) $y = ax^2 + b$

$b = 1$

$8 = a(8)^2 + 1$

$64a = 7$

$a = \frac{7}{64}$



(b) $y = \frac{7}{64}x^2 + 1$

$x^2 = \frac{64}{7}(y - 1)$

$V = \frac{64}{7}\pi\int_1^8 (y - 1)\, dy$

$= \frac{64}{7}\pi\left[\frac{y^2}{2} - y\right]_1^8$

$= \frac{64}{7}\pi\left\{\left[\frac{(8)^2}{2} - (8)\right] - \left[\frac{1^2}{2} - 1\right]\right\}$

$= \frac{64}{7}\pi\left(24\frac{1}{2}\right)$

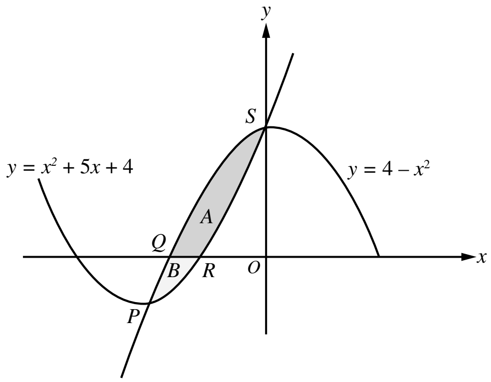
$= 703.808 \text{ cm}^3$

$= 703.808$ ml

Isi padu mangkuk tidak cukup untuk menampung isi padu susu 1.5 liter.

The volume of the bowl is not sufficient to hold the volume of 1.5 litres of milk.

7



(a) $x^2 + 5x + 4 = 4 - x^2$

$2x^2 + 5x = 0$

$x(2x + 5) = 0$

$x = 0, -2.5$

Apabila/*When* $x = 0$, $y = 4 - 0 = 4$

Apabila/*When* $x = -2.5$, $y = 4 - (-2.5)^2 = -2.25$

$\therefore P(-2.5, -2.25), S(0, 4)$

(b) $Q(x, 0), 4 - x^2 = 0$

$x^2 = 4$

$x = \pm 2$

$\therefore Q(-2, 0)$

$R(x, 0), x^2 + 5x + 4 = 0$

$(x + 4)(x + 1) = 0$

$x = -1, -4$

$\therefore R(-1, 0)$

(c) $A = \int_{-2}^{0} 4 - x^2\, dx - \int_{-1}^{0} x^2 + 5x + 4\, dx$

$= \left[4x - \frac{x^3}{3}\right]_{-2}^{0} - \left[\frac{x^3}{3} + \frac{5x^2}{2} + 4x\right]_{-1}^{0}$

$= 0 - \left[4(-2) - \frac{(-2)^3}{3}\right] - \left\{0 - \left[\frac{(-1)^3}{3} + \frac{5(-1)^2}{2} + 4(-1)\right]\right\}$

$= 5\frac{1}{3} - 1\frac{5}{6}$

$= 3\frac{1}{2}$ unit²/*units*²

$B = \left|\int_{-2.5}^{-1} x^2 + 5x + 4\, dx\right| - \left|\int_{-2.5}^{-2} 4 - x^2\, dx\right|$

$= \left|\left[\frac{x^3}{3} + \frac{5x^2}{2} + 4x\right]_{-2.5}^{-1}\right| - \left|\left[4x - \frac{x^3}{3}\right]_{-2.5}^{-2}\right|$

$= \left|\left[\frac{(-1)^3}{3} + \frac{5(-1)^2}{2} + 4(-1)\right] - \left[\frac{(-2.5)^3}{3} + \frac{5(-2.5)^2}{3} + 4(-2.5)\right]\right| - \left|\left[4(-2) - \frac{(-2)^3}{3}\right] - \left[4(-2.5) - \frac{(-2.5)^3}{3}\right]\right|$

$= 2\frac{1}{4} - \frac{13}{24}$

$= 1\frac{17}{24}$ unit²/*units*²

Jumlah luas kawasan berlorek

Total area of shaded region

$= 3\frac{1}{2} + 1\frac{17}{24}$

$= 5\frac{5}{24}$ unit²/*units*²