Penyelesaian Lengkap

Praktis 5

Praktis Formatif

1 (a) $d = 11 - 4$
$= 7$

(b) $T_{13} = 4 + (12)(7)$
$= 88$

2 $T_n < 0$
$63 + (n - 1)(-4) < 0$
$n > \frac{-63}{-4} + 1$
$n > 16.75$
$n = 17$

3 $T_7 = 2T_2$
$a + 6d = 2(a + d)$
$a + 6d = 2a + 2d$
$a = 4d \ldots ①$
$T_{11} = 21$
$a + 10d = 21 \ldots ②$
Gantikan ① ke dalam ②/*Substitute* ① *into* ②,
$14d = 21$
$d = \frac{3}{2}$ atau/*or* 1.5

Gantikan ke dalam ①/*Substitute into* ①,
$a = 4\left(\frac{3}{2}\right)$
$= 6$

4 (a) $a = 306, T_n = 493$
$306 + (n - 1)(17) = 493$
$n = 12$

(b) $S_{12} = \frac{12}{2}[306 + 493]$
$= 4\,794$

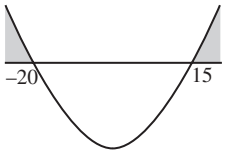
5 (a) $2x - 1 - (x - 2) = 4x - 7 - (2x - 1)$
$x + 1 = 2x - 6$
$x = 7$

(b) $7 - 2, 2(7) - 1, 4(7) - 7$
$5, 13, 21$
$a = 5, d = 8$
$T_4 + \ldots + T_{11}$
$= S_{11} - S_3$
$= \frac{11}{2}[2(5) + 10(8)] - (5 + 13 + 21)$
$= 456$

6 (a) $S_2 = 5(2)^2 - 2$
$= 18$

(b) $S_1 = 5(1)^2 - 1$
$= 4$
$T_2 = 18 - 4$
$= 14$
$d = 14 - 4$
$= 10$

7 $S_n > 900$
$\frac{n}{2}[2(18) + (n - 1)(6)] > 900$
$n[18 + 3n - 3] > 900$
$3n^2 + 15n > 900$
$3n^2 + 15n - 900 > 0$
$\div 3, n^2 + 5n - 300 > 0$
$(n + 20)(n - 15) > 0$



$n > 0, n > 15$
$\therefore n = 16$

8 $S_3 = 147$ atau/*or* $T_1 + T_2 + T_3 = 147$
$\frac{3}{2}[2a + 2(4)] = 147$ atau/*or* $a + (a + 4) + (a + 8)$
$3a + 12 = 147$
$a + 4 = 49$
$a = 45$

Tiga sebutan berturutan/*Three consecutive terms*
$= 45, 49, 53$

9 (a) $T_4 = 9$
$a + 3d = 9 \ldots ①$
$S_{10} - S_5 = 85$
$\frac{10}{2}[2a + 9d] - \frac{5}{2}[2a + 4d] = 85$
$10a + 45d - 5a - 10d = 85$
$5a + 35d = 85$
$a + 7d = 17 \ldots ②$
② – ①, $4d = 8$
$d = 2$

(b) Gantikan ke dalam ①/*Substitute into* ①,
$a + 3(2) = 9$
$a = 3$

10 (a) $S_{12} = 38\,400, d = 200$
$\frac{12}{2}[2a + 11(200)] = 38\,400$
$2a + 2\,200 = 6\,400$
$2a = 4\,200$
$a = 2\,100$

(b) $T_{12} = 2\,100 + 11(200)$
$= 4\,300$

11 $\frac{u}{3} = \frac{2v}{u}$

$v = \frac{u^2}{6}$

12 (a) $\frac{k}{k+4} = \frac{k-2}{k}$

$k^2 = k^2 + 2k - 8$

$k = 4$

(b) $r = \frac{4}{4+4}$

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

13 (a) $ar^2 = 2$ … ①

$ar^5 = 54$ … ②

$\frac{②}{①}, \frac{ar^5}{ar^2} = \frac{54}{2}$

$r^3 = 27$

$r = 3$

(b) Gantikan ke dalam ①/*Substitute into* ①,

$a(3)^2 = 2$

$a = \frac{2}{9}$

14 (a) $\frac{x}{6} = \frac{24}{x}$

$x^2 = 144$

$x = 12$

(b) $r = \frac{12}{6} = 2$

$S_7 = \frac{6(2^7 - 1)}{2 - 1}$

$= 762$

15 $S_n = 1\,562$

$\frac{162\left[\left(\frac{4}{3}\right)^n - 1\right]}{\frac{4}{3} - 1} = 1\,562$

$\left(\frac{4}{3}\right)^n - 1 = \frac{781}{243}$

$\left(\frac{4}{3}\right)^n = \frac{1\,024}{243}$

$\left(\frac{4}{3}\right)^n = \left(\frac{4}{3}\right)^5$

$n = 5$

16 $a = 35, r = -\frac{2}{5}$

$S_\infty = \frac{35}{1 + \frac{2}{5}}$

$= 25$

17 $0.236363636\ldots$

$= 0.2 + 0.036 + 0.00036 + 0.0000036 + \ldots$

$= \frac{1}{5} + \frac{0.036}{1 - 0.01}$

$= \frac{1}{5} + \frac{2}{55}$

$= \frac{13}{55}$

18 (a) $S_3 = 0.973S_\infty$

$\frac{a(1 - r^3)}{1 - r} = 0.973\left(\frac{a}{1 - r}\right)$

$1 - r^3 = 0.973$

$r^3 = 0.027$

$r = 0.3$

(b) $T_1 - T_2 = 21$

$a - a(0.3) = 21$

$0.7a = 21$

$a = 30$

19 (a) $\pi(4)^2, \pi(6)^2, \pi(9)^2$

$16\pi, 36\pi, 81\pi$

(b) $r = \frac{36\pi}{16\pi}$

$r = \frac{9}{4}$ atau/*or* 2.25

20 $a = 350\,000, r = 1.06$

$T_n > 800\,000$

$(350\,000)(1.06)^{n-1} > 800\,000$

$\lg 1.06^{n-1} > \lg\frac{16}{7}$

$(n - 1)\lg 1.06 > \lg\frac{16}{7}$

$n - 1 > 14.19$

$n > 15.19$

$n = 16$

∴ Tahun/*Year* 2027

Praktis Sumatif

Kertas 1

1 (a) $r = \frac{m^2}{2m}$

$= \frac{m}{2}$

$-1 < r < 1$

$-1 < \frac{m}{2} < 1$

$-2 < m < 2$

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

$2m = 6 - 3m$

$5m = 6$

$m = \frac{6}{5}$

$T_4 = \frac{m^3}{2}\left(\frac{m}{2}\right)$

$= \frac{1}{4}m^4$

$= \frac{1}{4}\left(\frac{6}{5}\right)^4$

$= \frac{324}{625}$

2 (a) $q - (2 - p) = 3p - q$

$2q = 2p + 2$

$q = p + 1$

(b) $d = p + 1 - (2 - p)$

$= 2p - 1$

$$S_9 = 360$$

$$\frac{9}{2}[2(2-p)+8(2p-1)] = 360$$

$$4 - 2p + 16p - 8 = 80$$

$$14p - 4 = 80$$

$$14p = 84$$

$$p = 6$$

3 (a) $S_6 - S_3$

$$= \frac{a(r^6-1)}{r-1} - \frac{a(r^3-1)}{r-1}$$

$$= \frac{a}{r-1}[(r^6-1)-(r^3-1)]$$

$$= \frac{a}{r-1}[r^6 - r^3]$$

$$= \frac{ar^3(r^3-1)}{r-1}$$

[S_3 dengan sebutan pertama/*with the first term of* ar^3]

$= ar^3 + ar^4 + ar^5$

$= T_4 + T_5 + T_6$

(b) $S_3 = 8(S_6 - S_3)$

$S_3 = 8S_6 - 8S_3$

$9S_3 = 8S_6$

$$9 \times \frac{a(r^3-1)}{r-1} = 8 \times \frac{a(r^6-1)}{r-1}$$

$$9(r^3-1) = 8(r^6-1)$$

$$9(r^3-1) = 8(r^3+1)(r^3-1)$$

$$9 = 8(r^3+1)$$

$$r^3 + 1 = \frac{9}{8}$$

$$r^3 = \frac{1}{8}$$

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

4 (a) $T_5 = 2m + 1$

$a + 4(3) = 2m + 1$

$a + 12 = 2m + 1$

$a = 2m - 11 \ldots ①$

$S_6 = 10m - 3$

$$\frac{6}{2}[2a + 5(3)] = 10m - 3$$

$3(2a + 15) = 10m - 3$

$6a + 45 = 10m - 3$

$6a = 10m - 48 \ldots (2)$

Gantikan ① ke dalam ②/*Substitute* ① *into* ②,

$6(2m - 11) = 10m - 48$

$12m - 66 = 10m - 48$

$2m = 18$

$m = 9$

(b) $S_\infty = 4T_2$

$$\frac{a}{1-r} = 4ar$$

$$1 = 4r - 4r^2$$

$4r^2 - 4r + 1 = 0$

$(2r-1)^2 = 0$

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

5 (a) (i) $S_{12} = 258$

$$\frac{12}{2}[2a + 11d] = 258$$

$2a + 11d = 43 \ldots ①$

Sebutan ganjil/*Odd terms*:

$a, a + 2d, 2 + 4d, \ldots, a + 10d$

$S_6 = 120$

$$\frac{6}{2}[2a + 5(2d)] = 120$$

$2a + 10d = 40 \ldots ②$

① − ②, $d = 3$

(ii) Gantikan ke dalam ②/*Substitute into* ②,

$2a + 10(3) = 40$

$a = 5$

(b) Biar p dan q masing-masing mewakili sebutan pertama janjang geometri P dan Q.

Let p and q represent the first term of geometric progressions P and Q respectively.

$S_{\infty P} = 3S_{\infty Q}$

$$\frac{p}{1-\frac{2}{3}} = 3 \times \frac{q}{1-\frac{1}{2}}$$

$3p = 3 \times 2q$

$p = 2q \ldots ①$

$T_{2P} - 2T_{2Q} = 9$

$$p\left(\frac{2}{3}\right) - 2q\left(\frac{1}{2}\right) = 9$$

$$\frac{2}{3}p - q = 9$$

$2p - 3q = 27 \ldots ②$

Gantikan ① ke dalam ②/*Substitute* ① *into* ②,

$2(2q) - 3q = 27$

$q = 27$

Gantikan ke dalam ①/*Substitute into* ①,

$p = 2(27)$

$= 54$

Kertas 2

1 (a) $T_1 = 2(2x) + 2x$

$= 6x$

$T_2 = 2[2(x+1)] + 2(x+1)$

$= 6(x+1)$

$= 6x + 6$

$T_3 = 2[2(x+2)] + 2(x+2)$

$= 6(x+2) = 6x + 12$

(b) $T_6 = 48$

$6x + 5(6) = 48$

$6x = 18$

$x = 3$

(c) $a = 6(3)$

$= 18$

$$\frac{n}{2}[2(18) + (n-1)(6)] = 450$$

$n[18 + 3n - 3] = 450$

$3n^2 + 15n = 450$

$n^2 + 5n = 150$

$n^2 + 5n - 150 = 0$

$(n + 15)(n - 10) = 0$

$n > 0, n = 10$

2 (a) $T_1 = \frac{1}{2}\pi x^2$

$T_2 = \frac{1}{2}\pi\left(\frac{1}{2}x\right)^2$

$= \frac{1}{8}\pi x^2$

$r = \frac{\frac{1}{8}\pi x^2}{\frac{1}{2}\pi x^2}$

$= \frac{1}{4}$

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

$\frac{1}{128}\pi x^2 = 2\pi$

$x^2 = 256$

$x = 16$

Jejari/*Radius* = 16 cm

(c) $S_\infty = \frac{128\pi}{1 - \frac{1}{4}}$

$= \frac{512}{3}\pi$ cm atau/*or* $170\frac{2}{3}\pi$ cm^2

3 (a) $a = 3, l = 37$

$S_n = 360$

$\frac{n}{2}(3 + 37) = 360$

$20n = 360$

$n = 18$

$T_{18} = 37$

$3 + 17d = 37$

$17d = 34$

$d = 2$

(b) Kaedah/*Method* 1:

$T_{11} + \ldots T_{18}$

$= S_{18} - S_{10}$

$= \frac{18}{2}[2(3) + 17(2)] - \frac{10}{2}[2(3) + 9(2)]$

$= 360 - 120$

$= 240$

Kaedah/*Method* 2:

$T_{11} = 3 + (10)(2)$

$= 23$

$S_8 = \frac{8}{2}(23 + 37)$

$= 240$

4 (a) $T_7 = 6\,700$

$5\,000r^6 = 6\,700$

$r^6 = 1.34$

$r = 1.34^{\frac{1}{6}}$

$= 1.049988$

≈ 1.05

Pulangan/*Return* = 5%

(b) Amaun pada akhir tahun yang pertama

Amount at the end of first year

$= 5\,000(1.05)$

Amaun pada akhir tahun yang kedua

Amount at the end of second year

$= 5\,000(1.05)^2 + 5\,000(1.05)$

Amaun pada akhir tahun yang ketiga

Amount at the end of third year

$= 5\,000(1.05)^3 + 5\,000(1.05)^2 + 5\,000(1.05)$

Amaun pada akhir tahun yang ke-lapan

Amount at the end of eighth year

$= 5\,000(1.05)^8 + 5\,000(1.05)^7 + 5\,000(1.05)^6 + \ldots + 5\,000(1.05)$

$= S9 - S1$

$= \frac{5\,000[1.05^9 - 1]}{1.05 - 1} - 5\,000$

= RM 50 133

Ya, dia boleh mencapai matlamatnya.

Yes, he can achieve his goal.

5 (a) $a = p, d = q$

$T_6 = 35$

$p + 5q = 35$

$p = 35 - 5q \ldots ①$

$S_{10} = 330$

$\frac{10}{2}[2p + 9q] = 330$

$2p + 9q = 66 \ldots ②$

Gantikan ① ke dalam ②/*Substitute* ① *into* ②,

$2(35 - 5q) + 9q = 66$

$70 - 10q + 9q = 66$

$q = 4$

Gantikan ke dalam ①/*Substitute into* ①,

$p = 35 - 5(4)$

$= 15$

(b) *A*: $a = 15, d = 4$, *B*: $a = 8, d = 5$

(i) $S_{nA} = S_{nB}$

$\frac{n}{2}[2(15) + (n - 1)(4)] = \frac{n}{2}[2(8) + (n - 1)(5)]$

$n[4n + 26] = n[5n + 11]$

$4n^2 + 26n = 5n^2 + 11n$ atau/*or* $4n + 26 = 5n + 11$

$n^2 - 15n = 0$

$n(n - 15) = 0$

$n \neq 0, \therefore n = 15$

(ii) $S_{15} = \frac{15}{2}[2(15) + (14)(4)]$

atau/*or*

$\frac{15}{2}[2(8) + (14)(5)]$

= 645 m

6 (a) $T_1 + T_2 = 24$

$a + ar = 24$

$a(1 + r) = 24 \ldots ①$

$T_3 = 54$

$ar^2 = 54 \ldots ②$

$\frac{②}{①}, \frac{ar^2}{a(1 + r)} = \frac{54}{24}$

$\frac{r^2}{1 + r} = \frac{9}{4}$

$4r^2 - 9r - 9 = 0$

$(4r + 3)(r - 3) = 0$

$r > 0$, $\therefore r = 3$

Gantikan ke dalam ②/*Substitute into* ②,

$a(3)^2 = 54$

$a = 6$

(b) $S_7 = \dfrac{6(3^7 - 1)}{3 - 1}$

$= 6\,558$

7 (a) $T_1 = 6x^2$

$T_2 = 6\left(\dfrac{2}{3}x\right)^2$

$= \dfrac{8}{3}x^2$

$T_3 = 6\left(\dfrac{4}{9}x\right)^2$

$= \dfrac{32}{27}x^2$

$\dfrac{T_2}{T_1} = \dfrac{\frac{8}{3}x^2}{6x^2} = \dfrac{4}{9}$

$\dfrac{T_2}{T_1} = \dfrac{\frac{32}{27}x^2}{\frac{8}{3}x^2} = \dfrac{4}{9}$

$\because \dfrac{T_3}{T_2} = \dfrac{T_2}{T_1}$

$\therefore$ Janjang geometri dengan $r = \dfrac{4}{9}$.

Geometric progression with $r = \dfrac{4}{9}$.

(b) Kaedah/*Method* 1:

$S_3 = 3\,192$

$\dfrac{6x^2\left(1 - \left(\frac{4}{9}\right)^3\right)}{1 - \frac{4}{9}} = 3\,192$

$\dfrac{266}{27}x^2 = 3\,192$

$x^2 = 324$

$x = 18$

Kaedah/*Method* 2:

$6x^2 + \dfrac{8}{3}x^2 + \dfrac{32}{27}x^2 = 3\,192$

$x^2 = 324$

$x = 18$

(c) $a = 6(18)^2$

$= 1\,944$

$T_n < 10$

$1\,944\left(\dfrac{4}{9}\right)^{n-1} < 10$

$\lg\left(\dfrac{4}{9}\right)^{n-1} < \lg\dfrac{5}{972}$

$(n - 1)\lg\left(\dfrac{4}{9}\right) < \lg\dfrac{5}{972}$

$n > 7.50$

$n = 8$

8 (a) (i) $T_3 = a + 2d$

$T_7 = a + 6d$

$a, a + 2d, a + 6d$

$\dfrac{a + 2d}{a} = \dfrac{a + 6d}{a + 2d}$

$(a + 2d)^2 = a(a + 6d)$

$a^2 + 4ad + 4d^2 = a^2 + 6ad$

$4d^2 - 2ad = 0$

$2d(2d - a) = 0$

$d \neq 0$, $\therefore a = 2d$

(ii) $r = \dfrac{a + 2d}{a}$

$r = \dfrac{2d + 2d}{2d}$

$= 2$

(b) $a(2)^4 = 48$

$a = 3$

$3 = 2d$

$d = \dfrac{3}{2}$

$S_9 = \dfrac{9}{2}\left[2(3) + 8\left(\dfrac{3}{2}\right)\right]$

$= 81$