

Penyelesaian Lengkap

PRAKTIS 2

Kertas 1

- 1 Matriks baris mempunyai hanya satu baris.

A row matrix has only one row.

Jawapan/Answer: A

- 3 3 baris, 2 lajur

3 rows, 2 columns → 3×2

Jawapan/Answer: B

- 3 $a_{21} + b_{12} = 10 + 10$
 $= 20$

Jawapan/Answer: D

- 4 $3x = 6y$

$$x = 2y \dots \textcircled{1}$$

Gantikan $\textcircled{1}$ ke dalam $5x + 3 = 2y + 11$

Substitute $\textcircled{1}$ into $5x + 3 = 2y + 11$

$$5(2y) - 2y = 11 - 3$$

$$8y = 8$$

$$y = 1$$

From $\textcircled{1}$, $x = 2(1)$

$$= 2$$

$$\therefore x + y = 2 + 1$$

$$= 3$$

Jawapan/Answer: C

- 5 $\begin{bmatrix} 12 \\ -3 \end{bmatrix} + M - \begin{bmatrix} 5 \\ 1 \end{bmatrix} = \begin{bmatrix} 11 \\ 8 \end{bmatrix}$

$$M = \begin{bmatrix} 11 \\ 8 \end{bmatrix} - \begin{bmatrix} 12 \\ -3 \end{bmatrix} + \begin{bmatrix} 5 \\ 1 \end{bmatrix}$$

$$= \begin{bmatrix} 11 - 12 + 5 \\ 8 - (-3) + 1 \end{bmatrix}$$

$$= \begin{bmatrix} 4 \\ 12 \end{bmatrix}$$

Jawapan/Answer: B

- 6 $\begin{bmatrix} -2 & x+2 \\ 3y & -1 \end{bmatrix} + \begin{bmatrix} 2 & 6 \\ 4-y & 3 \end{bmatrix} = \begin{bmatrix} 0 & 16 \\ 16 & 2 \end{bmatrix}$

$$\begin{bmatrix} -2+2 & x+2+6 \\ 3y+4-y & -1+3 \end{bmatrix} = \begin{bmatrix} 0 & 16 \\ 16 & 2 \end{bmatrix}$$

$$x + 2 + 6 = 16$$

$$x = 16 - 8$$

$$x = 8$$

$$3y + 4 - y = 16$$

$$2y = 16 - 4$$

$$2y = 12$$

$$\therefore x - 2y = 8 - 12$$

$$= -4$$

Jawapan/Answer: A

- 7 $\begin{bmatrix} 9+10 \\ -3x+12 \end{bmatrix} = \begin{bmatrix} 19 \\ 18 \end{bmatrix}$

$$-3x + 12 = 18$$

$$-3x = 18 - 12$$

$$x = \frac{6}{-3}$$

$$= -2$$

Jawapan/Answer: C

- 8 $\begin{bmatrix} 6 & 1 \\ x & 7 \end{bmatrix} \begin{bmatrix} 2 \\ -6 \end{bmatrix} = 2 \begin{bmatrix} 3 \\ 6 \end{bmatrix}$

$$\begin{bmatrix} 6(2) + 1(-6) \\ x(2) + 7(-6) \end{bmatrix} = \begin{bmatrix} 6 \\ 12 \end{bmatrix}$$

$$\begin{bmatrix} 12 - 6 \\ 2x - 42 \end{bmatrix} = \begin{bmatrix} 6 \\ 12 \end{bmatrix}$$

$$2x - 42 = 12$$

$$2x = 54$$

$$x = 27$$

Jawapan/Answer: C

- 9 $\begin{bmatrix} x \\ 8 \end{bmatrix} [x \ 4] = \begin{bmatrix} 25 & 20 \\ y & 32 \end{bmatrix}$

$$\begin{bmatrix} x^2 & 4x \\ 8x & 32 \end{bmatrix} = \begin{bmatrix} 25 & 20 \\ y & 32 \end{bmatrix}$$

$$x^2 = 25$$

$$x = 5$$

$$y = 8(5)$$

$$= 40$$

$$3x - y = 3(5) - 40$$

$$= -25$$

Jawapan/Answer: B

- 10 Katakan/Let $A = \begin{bmatrix} 4 & 6 \\ 2 & 8 \end{bmatrix}$, $A^{-1} = \frac{1}{(4)(8) - (6)(2)} \begin{bmatrix} 8 & -6 \\ -2 & 4 \end{bmatrix}$

$$= \frac{1}{32 - 12} \begin{bmatrix} 8 & -6 \\ -2 & 4 \end{bmatrix}$$

$$= \frac{1}{20} \begin{bmatrix} 8 & -6 \\ -2 & 4 \end{bmatrix}$$

$$= \frac{1}{10} \begin{bmatrix} 4 & -3 \\ -1 & 2 \end{bmatrix}$$

Jawapan/Answer: C

Kertas 2

Bahagian A

- 1 $\begin{bmatrix} 4 & 2 & p \\ 1 & q & 0 \end{bmatrix} \begin{bmatrix} -1 \\ 2 \\ 1 \end{bmatrix} = \begin{bmatrix} 11 \\ 8 \end{bmatrix}$

$$\begin{bmatrix} 4(-1) + 2(2) + p(1) \\ 1(-1) + q(2) + 0(1) \end{bmatrix} = \begin{bmatrix} 11 \\ 8 \end{bmatrix}$$

$$\begin{bmatrix} p \\ -1 + 2q \end{bmatrix} = \begin{bmatrix} 11 \\ 8 \end{bmatrix}$$

$$\begin{aligned}\therefore p &= 11 \\ 2q &= 8 + 1 \\ q &= 4.5 \\ \therefore p - 4q &= 11 - 4(4.5) \\ &= -7\end{aligned}$$

- 2 Jika songsang antara satu sama lain, maka $AB = BA = I$
If inverse matrix to one and another, then $AB = BA = I$

$$\begin{aligned}AB &= \begin{bmatrix} 4 & -1 \\ -3 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1 \\ 3 & 4 \end{bmatrix} \\ &= \begin{bmatrix} 4(1) + (-1)(3) & 4(1) + (-1)(4) \\ (-3)(1) + 1(3) & (-3)(1) + 1(4) \end{bmatrix} \\ &= \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}\end{aligned}$$

$$AB = I$$

$$\begin{aligned}BA &= \begin{bmatrix} 1 & 1 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} 4 & -1 \\ -3 & 1 \end{bmatrix} \\ &= \begin{bmatrix} 1(4) + 1(-3) & 1(-1) + 1(1) \\ 3(4) + 4(-3) & 3(-1) + 4(1) \end{bmatrix} \\ &= \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}\end{aligned}$$

$$BA = I$$

Kesimpulan: A dan B ialah matriks songsang antara satu sama lain.

Conclusion: A and B are inverse matrix to one and another.

- 3 (a) Jika tiada matriks songsang, penentu $P = 0$
If there is no inverse matrix, the determinant $P = 0$

$$\begin{aligned}2(3) - m(-4) &= 0 \\ 6 + 4m &= 0\end{aligned}$$

$$m = -\frac{6}{4}$$

$$m = -\frac{3}{2}$$

$$\begin{aligned}(b) P &= \begin{bmatrix} 2 & 1 \\ -4 & 3 \end{bmatrix}, P^{-1} = \frac{1}{2(3) - (1)(-4)} \begin{bmatrix} 3 & -1 \\ 4 & 2 \end{bmatrix} \\ &= \frac{1}{10} \begin{bmatrix} 3 & -1 \\ 4 & 2 \end{bmatrix} \\ &= \begin{bmatrix} 0.3 & -0.1 \\ 0.4 & 0.2 \end{bmatrix}\end{aligned}$$

Bahagian B

4 (a) $48x + 15y = 204$
 $x + y = 7$

$$(b) \begin{bmatrix} 48 & 15 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 204 \\ 7 \end{bmatrix} \text{ atau/ or } \begin{bmatrix} 1 & 1 \\ 48 & 15 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 7 \\ 204 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \end{bmatrix} = \frac{1}{48(1) - (15)(1)} \begin{bmatrix} 1 & -15 \\ -1 & 48 \end{bmatrix} \begin{bmatrix} 204 \\ 7 \end{bmatrix} \text{ atau/ or}$$

$$= \frac{1}{1(15) - (1)(48)} \begin{bmatrix} 15 & -1 \\ -48 & 1 \end{bmatrix} \begin{bmatrix} 7 \\ 204 \end{bmatrix}$$

$$= \frac{1}{33} \begin{bmatrix} (1)(204) + (-15)(7) \\ (-1)(204) + 48(7) \end{bmatrix} \text{ atau/ or}$$

$$\frac{1}{-33} \begin{bmatrix} (15)(7) + (-1)(204) \\ (-48)(7) + (1)(204) \end{bmatrix}$$

$$\begin{aligned}&= \frac{1}{33} \begin{bmatrix} 99 \\ 132 \end{bmatrix} \text{ atau/ or } \frac{1}{-33} \begin{bmatrix} -99 \\ -132 \end{bmatrix} \\ &= \begin{bmatrix} 3 \\ 4 \end{bmatrix}\end{aligned}$$

$$\therefore x = 3, y = 4$$

- (c) Jumlah perlu dibayar setiap sekolah

$$\begin{aligned}&= \begin{bmatrix} 20 & 25 \\ 44 & 24 \end{bmatrix} \begin{bmatrix} 48 \\ 15 \end{bmatrix} \\ &= \begin{bmatrix} 20(48) + 25(15) \\ 44(48) + 24(15) \end{bmatrix} \\ &= \begin{bmatrix} 1335 \\ 2472 \end{bmatrix}\end{aligned}$$

$$\therefore A = \text{RM1 } 335, B = \text{RM2 } 472$$

5 (a) $2.80x + 1.35y = 25$
 $x + y = 11$

- (b)

$$\begin{bmatrix} 2.80 & 1.35 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 25 \\ 11 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \end{bmatrix} = \frac{1}{2.80(1) - (1.35)(1)} \begin{bmatrix} 1 & -1.35 \\ -1 & 2.8 \end{bmatrix} \begin{bmatrix} 25 \\ 11 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \end{bmatrix} = \frac{1}{1.45} \begin{bmatrix} 1(25) + (-1.35)(11) \\ (-1)(25) + 2.8(11) \end{bmatrix}$$

$$= \frac{1}{1.45} \begin{bmatrix} 10.15 \\ 5.80 \end{bmatrix}$$

$$= \begin{bmatrix} 7 \\ 4 \end{bmatrix}$$

$$\therefore x = 7, y = 4$$

(c) $\begin{bmatrix} 2.80 & 1.35 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} 4 \\ 2 \end{bmatrix} = [2.80(4) + 1.35(2)]$
 $= [13.90]$

Jumlah perlu dibayar/Total payable = RM13.90

6 (a) (i) $\begin{bmatrix} 3 & 6 \\ 5 & 7 \end{bmatrix} \begin{bmatrix} a & b \\ c & d \end{bmatrix} = \begin{bmatrix} -9 & 0 \\ 0 & -9 \end{bmatrix}$
 $\begin{bmatrix} 3 & 6 \\ 5 & 7 \end{bmatrix} \begin{bmatrix} a & b \\ c & d \end{bmatrix} = -9 \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

$$= \frac{1}{-9} \begin{bmatrix} 3 & 6 \\ 5 & 7 \end{bmatrix} \begin{bmatrix} a & b \\ c & d \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

Jika/If $AB = I$

A dan B adalah matriks songsang antara satu yang lain.

A and B are inverse matrix to each other.

$$A = \begin{bmatrix} 3 & 6 \\ 5 & 7 \end{bmatrix}, B = \frac{1}{-9} \begin{bmatrix} a & b \\ c & d \end{bmatrix}$$

$$B = A^{-1}$$

$$= \frac{1}{3(7) - (6)(5)} \begin{bmatrix} 7 & -6 \\ -5 & 3 \end{bmatrix}$$

$$= \frac{1}{21 - 30} \begin{bmatrix} 7 & -6 \\ -5 & 3 \end{bmatrix}$$

$$= \frac{1}{-9} \begin{bmatrix} 7 & -6 \\ -5 & 3 \end{bmatrix}$$

$$a = 7, b = -6, c = -5, d = 3$$

$$(ii) A^{-1} = \frac{1}{-9} \begin{bmatrix} 7 & -6 \\ -5 & 3 \end{bmatrix}$$

$$(b) \begin{bmatrix} 3 & 6 \\ 5 & 7 \end{bmatrix} \begin{bmatrix} m \\ n \end{bmatrix} = \begin{bmatrix} 3 \\ 11 \end{bmatrix}$$

$$\begin{aligned} \begin{bmatrix} m \\ n \end{bmatrix} &= \frac{1}{-9} \begin{bmatrix} 7 & -6 \\ -5 & 3 \end{bmatrix} \begin{bmatrix} 3 \\ 11 \end{bmatrix} \\ &= \frac{1}{-9} \begin{bmatrix} 7(3) + (-6)(11) \\ (-5)(3) + 3(11) \end{bmatrix} \\ &= \begin{bmatrix} 5 \\ -2 \end{bmatrix} \end{aligned}$$

$$\therefore m = 5, n = -2$$

$$7 (a) 5x + 3y = 850$$

$$3x + 2y = 540$$

$$(b) \begin{bmatrix} 5 & 3 \\ 3 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 850 \\ 540 \end{bmatrix}$$

$$\begin{aligned} \begin{bmatrix} x \\ y \end{bmatrix} &= \frac{1}{5(2) - 3(3)} \begin{bmatrix} 2 & -3 \\ -3 & 5 \end{bmatrix} \begin{bmatrix} 850 \\ 540 \end{bmatrix} \\ &= \frac{1}{1} \begin{bmatrix} 2(850) + (-3)(540) \\ (-3)(850) + 5(540) \end{bmatrix} \\ &= \begin{bmatrix} 80 \\ 150 \end{bmatrix} \end{aligned}$$

$$x = 80, y = 150$$

$$(c) \frac{1}{10} \begin{bmatrix} 400 & 450 \end{bmatrix} \begin{bmatrix} 12\ 500 \\ 860 \end{bmatrix}$$

$$= \begin{bmatrix} 40 & 45 \end{bmatrix} \begin{bmatrix} 12\ 500 \\ 860 \end{bmatrix}$$

$$= [40(12\ 500) + 45(860)]$$

$$= [538\ 700]$$

$$\text{Jumlah bayaran/Total payment} = \text{RM}538\ 700$$

Bahagian C

$$8 (a) (i) m_{AC} = \frac{5 - (-4)}{2 - (-1)}$$

$$= \frac{9}{3}$$

$$= 3$$

$$y = 3x + c$$

Gantikan (2, 5) ke dalam persamaan.

Substitute (2, 5) into the equation.

$$5 = 3(2) + c$$

$$c = -1$$

$$y = 3x - 1$$

$$(ii) m_{BD} = \frac{3-1}{-1-3}$$

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

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

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

Gantikan (3, 1) ke dalam persamaan.

Substitute (3, 1) into the equation.

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

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

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

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

$$(b) y = 3x - 1 \rightarrow 3x - y = 1$$

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

$$\begin{bmatrix} 3 & -1 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 1 \\ 5 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \end{bmatrix} = \frac{1}{3(2) - (-1)(1)} \begin{bmatrix} 2 & 1 \\ -1 & 3 \end{bmatrix} \begin{bmatrix} 1 \\ 5 \end{bmatrix}$$

$$= \frac{1}{7} \begin{bmatrix} 2(1) + 1(5) \\ (-1)(1) + 3(5) \end{bmatrix}$$

$$= \frac{1}{7} \begin{bmatrix} 7 \\ 14 \end{bmatrix}$$

$$= \begin{bmatrix} 1 \\ 2 \end{bmatrix}$$

$$\therefore (1, 2)$$

(c)

$$\begin{bmatrix} 2 & 3 & -1 & -1 \\ 5 & 1 & -4 & 3 \end{bmatrix} + T = \begin{bmatrix} 1 & 1 & 1 & 1 \\ 2 & 2 & 2 & 2 \end{bmatrix}$$

$$T = \begin{bmatrix} 1 & 1 & 1 & 1 \\ 2 & 2 & 2 & 2 \end{bmatrix} - \begin{bmatrix} 2 & 3 & -1 & -1 \\ 5 & 1 & -4 & 3 \end{bmatrix}$$

$$= \begin{bmatrix} 1-2 & 1-3 & 1-(-1) & 1-(-1) \\ 2-5 & 2-1 & 2-(-4) & 2-3 \end{bmatrix}$$

$$= \begin{bmatrix} -1 & -2 & 2 & 2 \\ -3 & 1 & 6 & -1 \end{bmatrix}$$

$$T_A = \begin{bmatrix} -1 \\ -3 \end{bmatrix}, T_B = \begin{bmatrix} -2 \\ 1 \end{bmatrix}, T_C = \begin{bmatrix} 2 \\ 6 \end{bmatrix}, T_D = \begin{bmatrix} 2 \\ -1 \end{bmatrix}$$