

KEMENTERIAN PENDIDIKAN
Jabatan Pendidikan Negeri Terengganu

**MODUL
PERKEMBANGAN PEMBELAJARAN
SPM 2025**

MPP 3

**MATEMATIK TAMBAHAN
KERTAS 1**

Nama :

Kelas :

DISEDIAKAN OLEH PANEL AKRAM NEGERI TERENGGANU



Tidak dibenarkan menyunting atau mencetak mana-mana bahagian dalam modul ini
tanpa kebenaran Pengarah Pendidikan Negeri Terengganu



Rumus-rumus berikut boleh membantu anda menjawab soalan. Simbol-simbol yang diberi adalah yang biasa digunakan.

The following formulae may be helpful in answering the questions. The symbols given are the ones commonly used.

$$1. \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$2. \quad a^m \times a^n = a^{m+n}$$

$$3. \quad a^m \div a^n = a^{m-n}$$

$$4. \quad (a^m)^n = a^{mn}$$

$$5. \quad \log_a mn = \log_a m + \log_a n$$

$$6. \quad \log_a \frac{m}{n} = \log_a m - \log_a n$$

$$7. \quad \log_a m^n = n \log_a m$$

$$8. \quad \log_a b = \frac{\log_c b}{\log_c a}$$

$$9. \quad T_n = a + (n-1)d$$

$$10. \quad T_n = ar^{n-1}$$

$$11. \quad S_n = \frac{n}{2} \{2a + (n-1)d\}$$

$$12. \quad S_n = \frac{a(r^n - 1)}{r - 1} = \frac{a(1 - r^n)}{1 - r}, \quad r \neq 1$$

$$13. \quad S_\infty = \frac{a}{1-r}, \quad |r| < 1$$

$$14. \quad y = uv, \quad \frac{dy}{dx} = u \frac{dv}{dx} + v \frac{du}{dx}$$

$$15. \quad y = \frac{u}{v}, \quad \frac{dy}{dx} = \frac{v \frac{du}{dx} - u \frac{dv}{dx}}{v^2}$$

$$16. \quad \frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$$

$$17. \quad \text{Luas di bawah lengkung} \\ \text{Area under a curve}$$

$$= \int_a^b y \, dx \quad \text{atau (or)} \\ = \int_a^b x \, dy$$

$$18. \quad \text{Isi padu Kisaran} \\ \text{Volume of revolution}$$

$$= \int_a^b \pi y^2 \, dx \quad \text{atau (or)} \\ = \int_a^b \pi x^2 \, dy$$

$$19. \quad I = \frac{Q_1}{Q_0} \times 100$$

$$20. \quad \bar{I} = \frac{\sum W_i I_i}{\sum W_i}$$

$$21. \quad {}^n P_r = \frac{n!}{(n-r)!}$$

$$22. \quad {}^n C_r = \frac{n!}{(n-r)! r!}$$

$$23. \quad P(X=r) = {}^n C_r p^r q^{n-r}, \quad p+q=1$$

$$24. \quad \text{Min / Mean, } \mu = np$$

$$25. \quad \sigma = \sqrt{npq}$$

$$26. \quad Z = \frac{X - \mu}{\sigma}$$

27. Panjang lengkok, $s = r\theta$
Arc length, $s = r\theta$

28. Luas sektor, $A = \frac{1}{2} r^2 \theta$
Area of sector, $A = \frac{1}{2} r^2 \theta$

29. $\sin^2 A + \cos^2 A = 1$
 $\sin^2 A + \cos^2 A = 1$

30. $\sec^2 A = 1 + \tan^2 A$
 $\sec^2 A = 1 + \tan^2 A$

31. $\operatorname{cosec}^2 A = 1 + \cot^2 A$
 $\operatorname{cosec}^2 A = 1 + \cot^2 A$

32. $\sin 2A = 2 \sin A \cos A$
 $\sin 2A = 2 \sin A \cos A$

33. $\cos 2A = \cos^2 A - \sin^2 A$
 $= 2 \cos^2 A - 1$
 $= 1 - 2 \sin^2 A$
 $\cos 2A = \cos^2 A - \sin^2 A$
 $= 2 \cos^2 A - 1$
 $= 1 - 2 \sin^2 A$

34. $\tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$

35. $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$
 $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$

36. $\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$
 $\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$

37. $\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$

38. $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

39. $a^2 = b^2 + c^2 - 2bc \cos A$
 $a^2 = b^2 + c^2 - 2bc \cos A$

40. Luas segi tiga / *Area of triangle*
 $= \frac{1}{2} ab \sin C$

41. Titik yang membahagi suatu tembereng
A point dividing a segment of a line
 $(x, y) = \left(\frac{nx_1 + mx_2}{m+n}, \frac{ny_1 + my_2}{m+n} \right)$

42. Luas segi tiga / *Area of triangle*
 $\frac{1}{2} |(x_1 y_2 + x_2 y_3 + x_3 y_1) - (x_2 y_1 + x_3 y_2 + x_1 y_3)|$

43. $|r| = \sqrt{x^2 + y^2}$

44. $\hat{r} = \frac{x\mathbf{i} + y\mathbf{j}}{\sqrt{x^2 + y^2}}$

THE UPPER TAIL PROBABILITY $Q(z)$ FOR THE NORMAL DISTRIBUTION $N(0, 1)$ KEBARANGKALIAN HUJUNG ATAS $Q(z)$ BAGI TABURAN KEBARANGKALIAN $N(0,1)$

z	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
											Minus / Tolak								
0.0	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.4641	4	8	12	16	20	24	28	32	36
0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247	4	8	12	16	20	24	28	32	36
0.2	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.3859	4	8	12	15	19	23	27	31	35
0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.3483	4	7	11	15	19	22	26	30	34
0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.3121	4	7	11	15	18	22	25	29	32
0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.2776	3	7	10	14	17	20	24	27	31
0.6	0.2743	0.2709	0.2676	0.2643	0.2611	0.2578	0.2546	0.2514	0.2483	0.2451	3	7	10	13	16	19	23	26	29
0.7	0.2420	0.2389	0.2358	0.2327	0.2296	0.2266	0.2236	0.2206	0.2177	0.2148	3	6	9	12	15	18	21	24	27
0.8	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922	0.1894	0.1867	3	5	8	11	14	16	19	22	25
0.9	0.1841	0.1814	0.1788	0.1762	0.1736	0.1711	0.1685	0.1660	0.1635	0.1611	3	5	8	10	13	15	18	20	23
1.0	0.1587	0.1562	0.1539	0.1515	0.1492	0.1469	0.1446	0.1423	0.1401	0.1379	2	5	7	9	12	14	16	19	21
1.1	0.1357	0.1335	0.1314	0.1292	0.1271	0.1251	0.1230	0.1210	0.1190	0.1170	2	4	6	8	10	12	14	16	18
1.2	0.1151	0.1131	0.1112	0.1093	0.1075	0.1056	0.1038	0.1020	0.1003	0.0985	2	4	6	7	9	11	13	15	17
1.3	0.0968	0.0951	0.0934	0.0918	0.0901	0.0885	0.0869	0.0853	0.0838	0.0823	2	3	5	6	8	10	11	13	14
1.4	0.0808	0.0793	0.0778	0.0764	0.0749	0.0735	0.0721	0.0708	0.0694	0.0681	1	3	4	6	7	8	10	11	13
1.5	0.0668	0.0655	0.0643	0.0630	0.0618	0.0606	0.0594	0.0582	0.0571	0.0559	1	2	4	5	6	7	8	10	11
1.6	0.0548	0.0537	0.0526	0.0516	0.0505	0.0495	0.0485	0.0475	0.0465	0.0455	1	2	3	4	5	6	7	8	9
1.7	0.0446	0.0436	0.0427	0.0418	0.0409	0.0401	0.0392	0.0384	0.0375	0.0367	1	2	3	4	4	5	6	7	8
1.8	0.0359	0.0351	0.0344	0.0336	0.0329	0.0322	0.0314	0.0307	0.0301	0.0294	1	1	2	3	4	4	5	6	6
1.9	0.0287	0.0281	0.0274	0.0268	0.0262	0.0256	0.0250	0.0244	0.0239	0.0233	1	1	2	2	3	4	4	5	5
2.0	0.0228	0.0222	0.0217	0.0212	0.0207	0.0202	0.0197	0.0192	0.0188	0.0183	0	1	1	2	2	3	3	4	4
2.1	0.0179	0.0174	0.0170	0.0166	0.0162	0.0158	0.0154	0.0150	0.0146	0.0143	0	1	1	2	2	2	3	3	4
2.2	0.0139	0.0136	0.0132	0.0129	0.0125	0.0122	0.0119	0.0116	0.0113	0.0110	0	1	1	1	2	2	2	3	3
2.3	0.0107	0.0104	0.0102								0	1	1	1	1	2	2	2	2
				0.00990	0.00964	0.00939	0.00914				3	5	8	10	13	15	18	20	23
								0.00889	0.00866	0.00842	2	5	7	9	12	14	16	16	21
2.4	0.00820	0.00798	0.00776	0.00755	0.00734						2	4	6	8	11	13	15	17	19
						0.00714	0.00695	0.00676	0.00657	0.00639	2	4	6	7	9	11	13	15	17
2.5	0.00621	0.00604	0.00587	0.00570	0.00554	0.00539	0.00523	0.00508	0.00494	0.00480	2	3	5	6	8	9	11	12	14
2.6	0.00466	0.00453	0.00440	0.00427	0.00415	0.00402	0.00391	0.00379	0.00368	0.00357	1	2	3	5	6	7	9	9	10
2.7	0.00347	0.00336	0.00326	0.00317	0.00307	0.00298	0.00289	0.00280	0.00272	0.00264	1	2	3	4	5	6	7	8	9
2.8	0.00256	0.00248	0.00240	0.00233	0.00226	0.00219	0.00212	0.00205	0.00199	0.00193	1	1	2	3	4	4	5	6	6
2.9	0.00187	0.00181	0.00175	0.00169	0.00164	0.00159	0.00154	0.00149	0.00144	0.00139	0	1	1	2	2	3	3	4	4
3.0	0.00135	0.00131	0.00126	0.00122	0.00118	0.00114	0.00111	0.00107	0.00104	0.00100	0	1	1	2	2	2	3	3	4

Bahagian A

[64 markah]

Jawab **semua** soalan.

- 1 Selesaikan persamaan serentak $2x - 3y = 5$ dan $2x^2 + y^2 = 8$.

Berikan jawapan anda tepat kepada tiga angka bererti.

[5 markah]

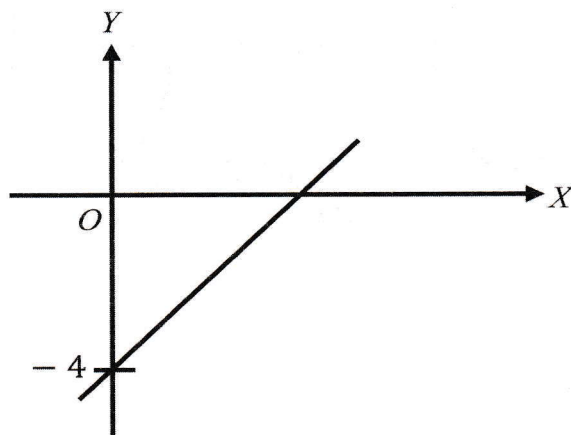
*Solve the simultaneous equations $2x - 3y = 5$ and $2x^2 + y^2 = 8$.**Give your answers correct to three significant figures.*

[5 marks]

Jawapan / Answer:

- 2 Rajah 1 menunjukkan graf garis lurus yang diperoleh apabila $y = \frac{2x}{x^3 - 8}$ ditukarkan dalam bentuk linear.

Diagram 1 shows the straight line graph obtained when $y = \frac{2x}{x^3 - 8}$ is convert to linear form.



Rajah 1
Diagram 1

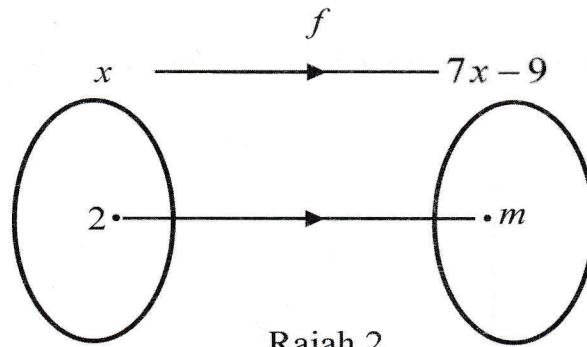
Ungkapkan X dan Y dalam sebutan x dan / atau y .
Express X and Y in terms of x and / or y .

[2 markah]

[2 marks]

Jawapan / Answer:

- 3 Rajah 2 menunjukkan fungsi $f : x \rightarrow 7x - 9$.
Diagram 2 shows the function $f : x \rightarrow 7x - 9$.



Rajah 2
Diagram 2

- (a) Cari nilai m . [1 markah]
Find the value m . [1 mark]

- (b) Diberi fungsi $f : x \rightarrow x + 4$ dan $gf : x \rightarrow \frac{x-4}{x+1}, x \neq -1$. Cari fungsi g . [2 markah]

Given that function $f : x \rightarrow x + 4$ and $gf : x \rightarrow \frac{x-4}{x+1}, x \neq -1$. Find the function g .

[2 marks]

Jawapan / Answer:

4 (a) Diberi $\underline{u} = \begin{pmatrix} 7 \\ 9 \end{pmatrix}$ dan $\underline{v} = \begin{pmatrix} n-1 \\ 3 \end{pmatrix}$.

Given $\underline{u} = \begin{pmatrix} 7 \\ 9 \end{pmatrix}$ and $\underline{v} = \begin{pmatrix} n-1 \\ 3 \end{pmatrix}$.

Cari nilai n yang mungkin, jika

Find the possible value of n , if

(i) $\underline{u}$ dan $\underline{v}$ selari,

$\underline{u}$ and $\underline{v}$ are parallel,

(ii) $|\underline{u}| = |\underline{v}|$.

[4 markah]

[4 marks]

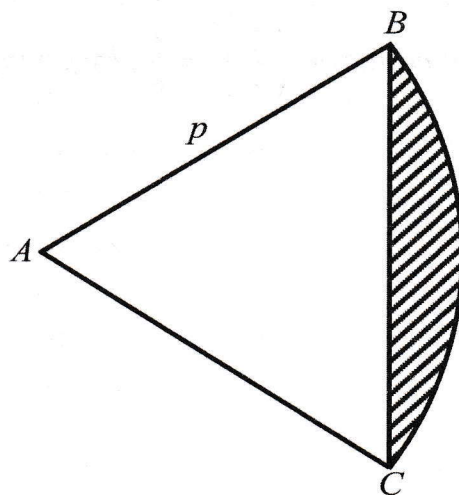
Jawapan / Answer:

- (b) Diberi $\underline{p} = \begin{pmatrix} m-1 \\ 1 \end{pmatrix}$ dan $\underline{q} = \begin{pmatrix} 9 \\ 8 \end{pmatrix}$, dengan keadaan m ialah pemalar. Cari nilai m jika $\underline{p}$ berserenjang dengan $\underline{q}$. [3 markah]

Given $\underline{p} = \begin{pmatrix} m-1 \\ 1 \end{pmatrix}$ and $\underline{q} = \begin{pmatrix} 9 \\ 8 \end{pmatrix}$, such that m is a constant. Find the value of m if $\underline{p}$ is perpendicular to $\underline{q}$. [3 marks]

Jawapan / Answer:

- 5 Rajah 3 menunjukkan sektor ABC berpusat A , dengan keadaan $AB = BC = AC$.
Diagram 3 shows a sector ABC with centre A , where $AB = BC = AC$.



Rajah 3
Diagram 3

Cari perimeter, dalam sebutan p dan π , kawasan berlorek.
Find the perimeter, in terms of p and π , of the shaded region.

[3 markah]

[3 marks]

Jawapan / Answer:

- 6 Selesaikan persamaan fungsi eksponen $\left(\frac{1}{3}\right)^p = \frac{1}{6}$ dengan memberikan jawapan dalam bentuk $a + \log_3 b$, a dan b adalah pemalar. [3 markah]

Solve the following exponential equation $\left(\frac{1}{3}\right)^p = \frac{1}{6}$, by giving the answer in the form of $a + \log_3 b$, a and b are constants. [3 marks]

Jawapan / Answer:

- 7 Syarikat Perabot Damia berjaya menjual sebanyak 30 000 buah set meja makan pada tahun 2019. Setiap tahun, jualan set meja makan syarikat tersebut meningkat sebanyak 2.5%.

Damia Furniture Company successfully sold 30 000 dining table sets in 2019. Each year, the company's sales of dining table sets increase by 2.5%.

- (a) Cari jumlah set meja makan yang dijual dari tahun 2019 hingga tahun 2025.

[3 markah]

Find the total number of dining table sets sold from 2019 to 2025.

[3 marks]

- (b) Jika 24% daripada set meja makan yang dijual dari tahun 2021 hingga tahun 2025 adalah set meja makan bulat dan 15% set meja makan segiempat, hitung hasil tambah set meja makan bulat dan set meja makan segiempat. [4 markah]

If 24% of the dining table sets sold from 2021 to 2025 are round dining table sets and 15% are square dining table sets, calculate the sum of round dining table sets and square dining table sets.

[4 marks]

Jawapan / Answer:

Jawapan / Answer:

1. (a) The diagram shows a cross-section of a river bed. The river bed is composed of sand and silt. The river bed is eroded in the middle of the river. The river bed is deposited in the sides of the river.

(b) The diagram shows a cross-section of a river bed. The river bed is composed of sand and silt. The river bed is eroded in the middle of the river. The river bed is deposited in the sides of the river.

(c) The diagram shows a cross-section of a river bed. The river bed is composed of sand and silt. The river bed is eroded in the middle of the river. The river bed is deposited in the sides of the river.

(d) The diagram shows a cross-section of a river bed. The river bed is composed of sand and silt. The river bed is eroded in the middle of the river. The river bed is deposited in the sides of the river.

(e) The diagram shows a cross-section of a river bed. The river bed is composed of sand and silt. The river bed is eroded in the middle of the river. The river bed is deposited in the sides of the river.

(f) The diagram shows a cross-section of a river bed. The river bed is composed of sand and silt. The river bed is eroded in the middle of the river. The river bed is deposited in the sides of the river.

(g) The diagram shows a cross-section of a river bed. The river bed is composed of sand and silt. The river bed is eroded in the middle of the river. The river bed is deposited in the sides of the river.

(h) The diagram shows a cross-section of a river bed. The river bed is composed of sand and silt. The river bed is eroded in the middle of the river. The river bed is deposited in the sides of the river.

- 8 (a) Lakar graf $y = \cos 2x + 1$ untuk $0 \leq x \leq 2\pi$. [3 markah]
Sketch the graph of $y = \cos 2x + 1$ for $0 \leq x \leq 2\pi$. [3 marks]

- (b) Seterusnya, dengan menggunakan paksi yang sama, lakar satu graf garis lurus yang sesuai untuk mencari bilangan penyelesaian bagi persamaan $\cos 2x = 1 - \frac{x}{4\pi}$ untuk $0 \leq x \leq 2\pi$.
Nyatakan bilangan penyelesaian tersebut. [2 markah]

Hence, using the same axes, sketch a suitable straight line graph to find the number of solutions to the equation $\cos 2x = 1 - \frac{x}{4\pi}$ for $0 \leq x \leq 2\pi$.

State the number of solutions. [2 marks]

Jawapan / Answer:

- 9 (a) (i) Diberi dua fungsi, $u(x)$ dan $v(x)$. Menggunakan pembezaan dengan prinsip pertama, buktikan petua hasil darab di bawah.

Given two functions, $u(x)$ and $v(x)$. Using differentiation from first principles, prove the product rule below.

$$\frac{d}{dx}[u(x)v(x)] = u(x)v'(x) + v(x)u'(x)$$

- (ii) Seterusnya, bezakan $(2x-3)^4(3x+2)$ terhadap x .

Hence, differentiate $(2x-3)^4(3x+2)$ with respect to x .

[5 markah]

[5 marks]

Jawapan / Answer:

- (b) Alam Jaya Holding adalah sebuah syarikat pembinaan yang menawarkan pakej “Rumah Rahmah” dengan harga yang berpatutan. Jika kos pengeluaran tahunan, $K(n)$, bagi menghasilkan n unit rumah diberi oleh persamaan, $K(n) = 2n^2 - 100n + 1375000$. Tentukan bilangan n unit rumah yang perlu dihasilkan bagi meminimumkan kos pengeluaran tahunan dengan menggunakan kaedah kalkulus.

Seterusnya, kira kos pengeluaran tahunan syarikat tersebut.

[4 markah]

Alam Jaya Holding is a construction company that offers the “Rumah Rahmah” package at an affordable price. If the annual production cost, $K(n)$, for producing n units of houses is given by the equation $K(n) = 2n^2 - 100n + 1375000$. Determine the number of n units of houses that need to be produced to minimize the annual production cost by using calculus method.

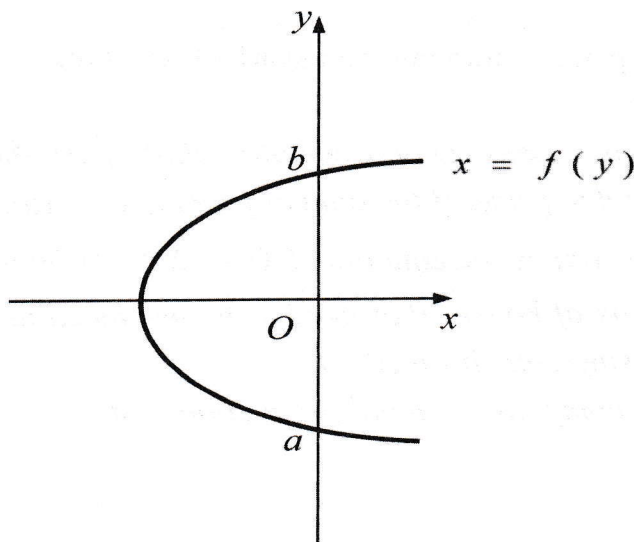
Hence, calculate the company's annual production cost.

[4 marks]

Jawapan / Answer:

- 10 (a) Rajah 4 menunjukkan lengkung $x = f(y)$ yang menyilang paksi- y di $y = a$ dan $y = b$.

Diagram 4 shows the curve $x = f(y)$ intersecting the y -axis at $y = a$ and $y = b$.



Rajah 4
Diagram 4

Diberi bahawa luas yang dibatasi lengkung itu dengan paksi- y ialah 10 unit^2 .

Cari nilai $\int_a^b 2f(y) dy$.

[2 markah]

Given that the area bounded by the curve and the y -axis is 10 unit^2 .

Find the value of $\int_a^b 2f(y) dy$.

[2 marks]

Jawapan / Answer:

(b) Diberi bahawa $\int_1^3 g(x) dx = -3$, cari nilai k jika $\int_1^3 [2g(x) + x - k] dx = 3k$. [4 markah]

Given that $\int_1^3 g(x) dx = -3$, find the value of k if $\int_1^3 [2g(x) + x - k] dx = 3k$. [4 marks]

Jawapan / Answer:

11 (a) (i) Tunjukkan $\frac{(n-1)!}{(n-3)!} = n^2 - 3n + 2$.

Show that $\frac{(n-1)!}{(n-3)!} = n^2 - 3n + 2$.

(ii) Jika ${}^xC_a = {}^xC_b$, ungkapkan x dalam sebutan a dan b .

If ${}^xC_a = {}^xC_b$, express x in terms of a and b .

[3 markah]

[3 marks]

Jawapan / Answer:

- (b) Sebuah jawatankuasa persatuan ibu bapa dan guru terdiri daripada 6 orang yang dipilih daripada 7 ibu bapa, 4 guru dan seorang pengetua.

Berapakah cara jawatankuasa itu boleh dibentuk jika

A committee of parent teacher association is made up of 6 people chosen from 7 parents, 4 teachers and a principal.

How many ways can the committee be formed if it

- (i) mesti termasuk seorang pengetua,
must include a principal,
- (ii) tepat 3 orang ibu bapa,
exactly 3 parents,
- (iii) tidak lebih daripada 3 orang guru.
not more than 3 teachers.

[5 markah]

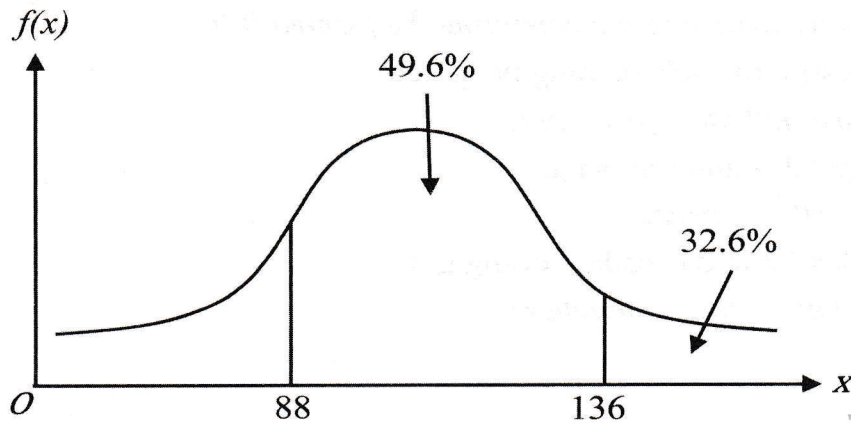
[5 marks]

Jawapan / Answer:

- 12 Rajah 5 menunjukkan graf tinggi kanak-kanak, dalam cm, di suatu pusat asuhan. Tinggi kanak-kanak tersebut bertaburan secara normal dengan min, μ dan sisihan piawai, σ .

Diagram 5 shows the graph of the heights of children, in cm, at a childcare center.

The children's heights are normally distributed with a mean, μ and a standard deviation, σ .



Rajah 5
Diagram 5

Hitung nilai μ dan nilai σ .

[6 markah]

Find the value of μ and of σ .

[6 marks]

Jawapan / Answer:

Jawapan / Answer:

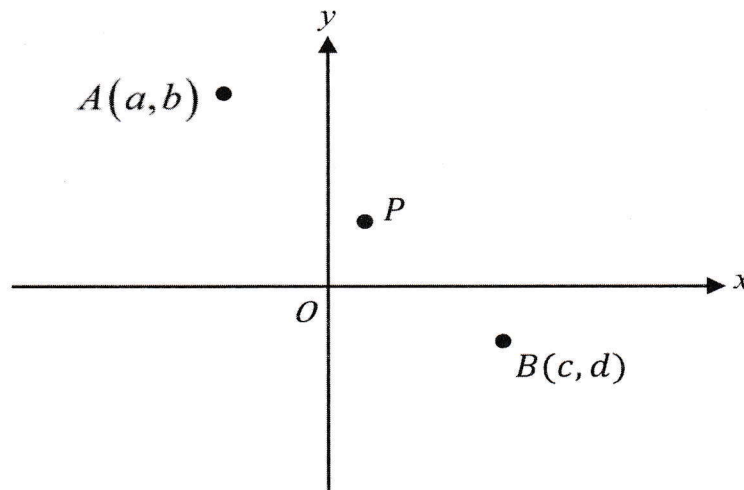
Bahagian B

[16 markah]

Jawab mana-mana **dua** soalan daripada bahagian ini.

- 13 Rajah 6 menunjukkan titik-titik A , B dan P .

Diagram 6 below shows points A , B and P .



Rajah 6
Diagram 6

- (a) Diberi bahawa titik P membahagi tembereng garis AB dalam nisbah $m : n$.

Tunjukkan bahawa $x = \frac{an + cm}{m + n}$. [2 markah]

Given that point P divides line segment AB in the ratio $m:n$.

Show that $x = \frac{an + cm}{m + n}$. [2 marks]

- (b) Seterusnya, cari koordinat P jika nilai a , b , c dan d ialah -3 , 7 , 3 dan -2 dengan keadaan $AP : PB$ ialah $2 : 1$. [2 markah]

Hence, find the coordinates of P if the values of a , b , c and d are -3 , 7 , 3 and -2 such that $AP : PB$ is $2 : 1$. [2 marks]

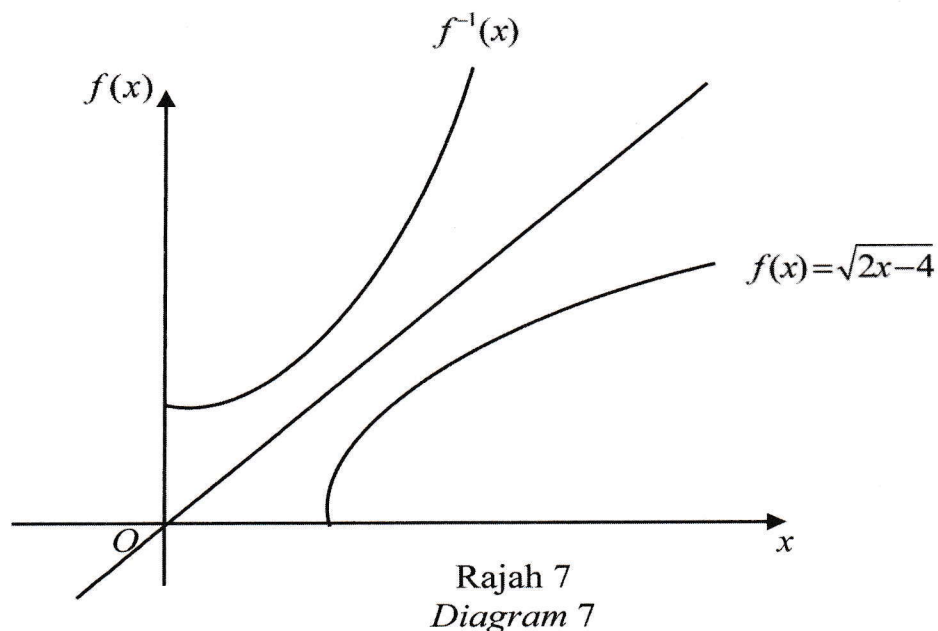
- (c) Cari persamaan garis lurus yang berserenjang dengan AB dan melalui titik P . [4 markah]

Find the equation of the straight line perpendicular to AB and passing through point P . [4 marks]

Jawapan / Answer:

- 14 (a) Rajah 7 menunjukkan graf bagi fungsi $f(x) = \sqrt{2x-4}$ untuk $2 \leq x \leq 4$. Graf fungsi $f^{-1}(x)$ adalah imej bagi $f(x)$ di bawah pantulan pada garis $f(x) = x$.

Diagram 7 shows the graph of $f(x) = \sqrt{2x-4}$ for $2 \leq x \leq 4$. The graph of $f^{-1}(x)$ is the image of $f(x)$ under the reflection of the line $f(x) = x$.



Cari

Find

- (i) fungsi $f^{-1}(x)$,
the function $f^{-1}(x)$,
- (ii) domain dan julat bagi fungsi $f^{-1}(x)$,
the domain and range of the function $f^{-1}(x)$,
- (iii) $f^{-1}f(3)$.

[5 markah]
[5 marks]

Jawapan / *Answer*:



- (b) Diberi fungsi $h: x \rightarrow \frac{x}{3} + c$, dengan keadaan c ialah pemalar. Jika $h(x)$ memetakan 4 kepada dirinya sendiri, cari nilai c . [3 markah]

Given function of $h: x \rightarrow \frac{x}{3} + c$, where c is a constant. If $h(x)$ maps 4 onto itself, find the value of c . [3 marks]

Jawapan / Answer:

- 15 (a) Diberi bahawa persamaan kuadratik $px^2 - 7qx + 16p = 0$, dengan keadaan p dan q ialah pemalar mempunyai dua punca nyata yang sama, cari nisbah $p : q$.
Seterusnya, cari nilai $p + q$. [3 markah]

Given the quadratic equation $px^2 - 7qx + 16p = 0$, where p and q are constant and equal roots, find $p : q$.

Hence, find the value of $p + q$. [3 marks]

- (b) Cari julat nilai x bagi ketaksamaan kuadratik $2x^2 \leq 1 + x$ dengan menggunakan kaedah garis nombor. [2 markah]

Find the range of values of x for the quadratic inequality $2x^2 \leq 1 + x$ by using the number line method. [2 marks]

- (c) Diberi fungsi kuadratik $g(x) = a(x - b)^2 + c$, dengan keadaan a , b dan c ialah pemalar, mempunyai nilai maksimum 10. Persamaan paksi simetri bagi graf $g(x)$ itu ialah $x = 4$.

Given a quadratic function $g(x) = a(x - b)^2 + c$, where a , b and c are constants, has a maximum value of 10. The equation of the axis of symmetry of the graph $g(x)$ is $x = 4$.

Cari

Find

- (i) julat nilai a ,
the range of values of a ,
- (ii) nilai b ,
the values of b ,
- (iii) nilai c .
the values of c .

[3 markah]

[3 marks]

Jawapan / *Answer*:

KERTAS PEPERIKSAAN TAMAT
END OF QUESTION PAPER