

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

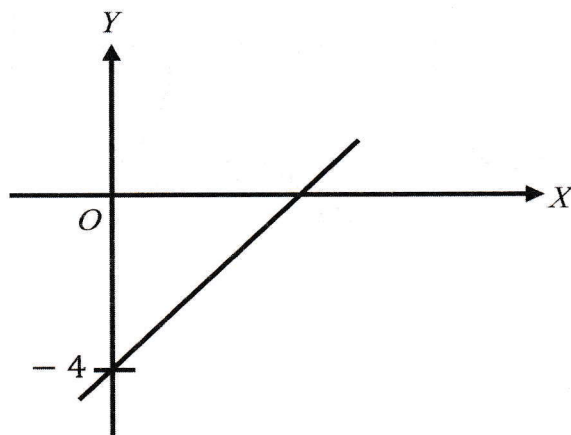
Give your answers correct to three significant figures.

[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

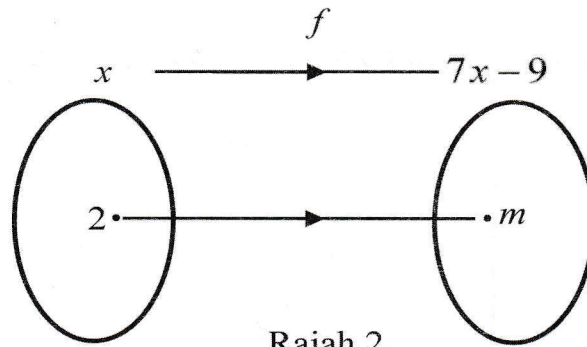
Ungkapkan X dan Y dalam sebutan x dan / atau y .
Express X and Y in terms of x and / or y .

[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]

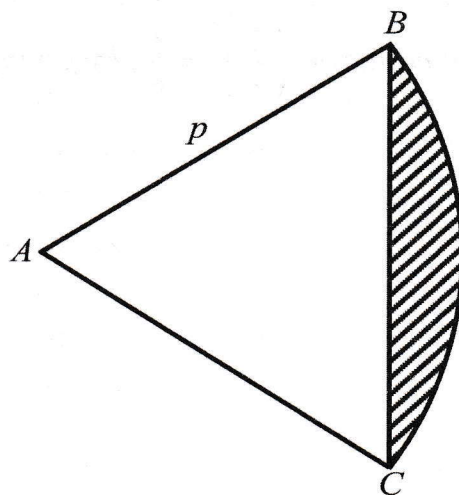
Jawapan / Answer:

- (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 different layers of sediment. The top layer is composed of fine sand and silt. Below this is a layer of coarse sand and gravel. The bottom layer is composed of large boulders and pebbles.

(b) The diagram shows a cross-section of a river bed. The river bed is composed of different layers of sediment. The top layer is composed of fine sand and silt. Below this is a layer of coarse sand and gravel. The bottom layer is composed of large boulders and pebbles.

(c) The diagram shows a cross-section of a river bed. The river bed is composed of different layers of sediment. The top layer is composed of fine sand and silt. Below this is a layer of coarse sand and gravel. The bottom layer is composed of large boulders and pebbles.

(d) The diagram shows a cross-section of a river bed. The river bed is composed of different layers of sediment. The top layer is composed of fine sand and silt. Below this is a layer of coarse sand and gravel. The bottom layer is composed of large boulders and pebbles.

(e) The diagram shows a cross-section of a river bed. The river bed is composed of different layers of sediment. The top layer is composed of fine sand and silt. Below this is a layer of coarse sand and gravel. The bottom layer is composed of large boulders and pebbles.

(f) The diagram shows a cross-section of a river bed. The river bed is composed of different layers of sediment. The top layer is composed of fine sand and silt. Below this is a layer of coarse sand and gravel. The bottom layer is composed of large boulders and pebbles.

(g) The diagram shows a cross-section of a river bed. The river bed is composed of different layers of sediment. The top layer is composed of fine sand and silt. Below this is a layer of coarse sand and gravel. The bottom layer is composed of large boulders and pebbles.

- 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.

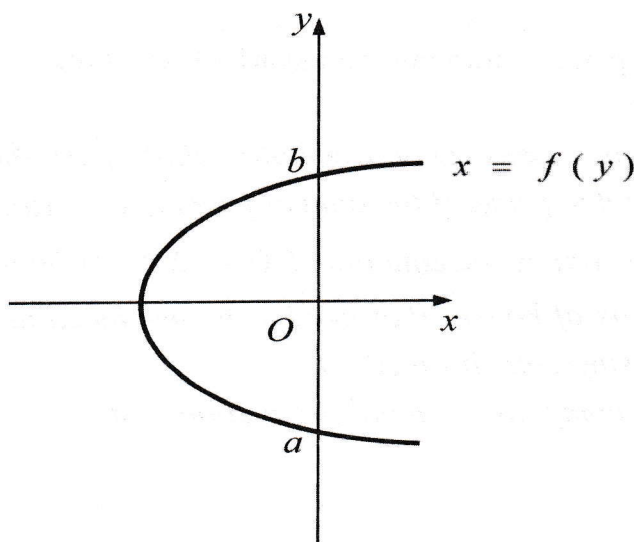
Hence, calculate the company's annual production cost.

[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]

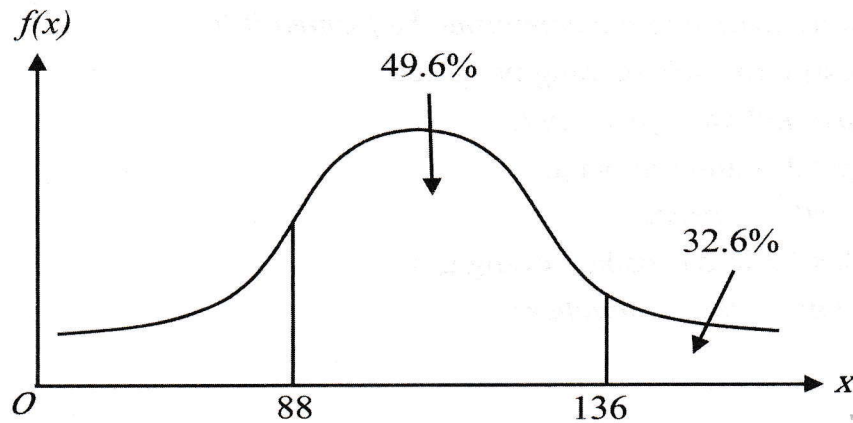
[5 marks]

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:

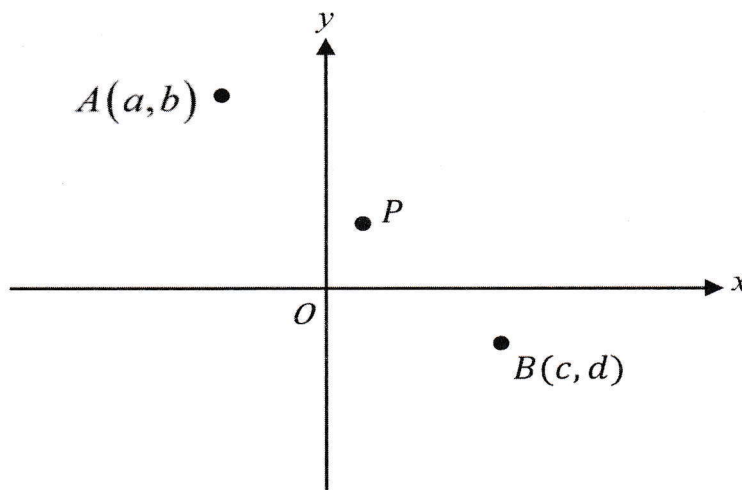
Bahagian B

[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]

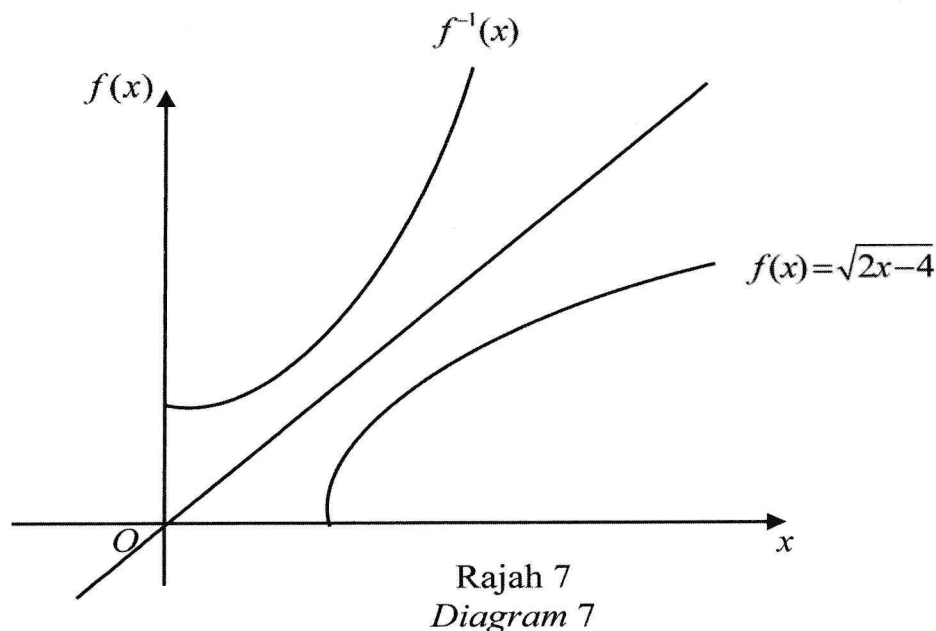
- (c) Cari persamaan garis lurus yang berserenjang dengan AB dan melalui titik P . [4 markah]

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