Format SPM 2021 (KSSM)

FORMAT INSTRUMEN PEPERIKSAAN SPM MULAI TAHUN 2021
MATA PELAJARAN MATEMATIK TAMBAHAN (3742)

Bil.	Perkara	Kertas 1 (3472/1)	Kertas 2 (3472/2)
1	Jenis instrumen	Ujian Bertulis	
2	Jenis item	• Subjektif Respons Terhad • Subjektif Respons Terhad Berstruktur	
3	Bilangan soalan	**Bahagian A** 12 soalan (64 markah) (Jawab **semua** soalan) **Bahagian B** 3 soalan (16 markah) (Jawab **dua** soalan)	**Bahagian A** 7 soalan (50 markah) (Jawab **semua** soalan) **Bahagian B** 4 soalan (30 markah) (Jawab **tiga** soalan) **Bahagian C** 4 soalan (20 markah) (Jawab **dua** soalan)
4	Jumlah Markah	80	100
5	Konstruk	• Mengingat & Memahami • Mengaplikasi • Menganalisis • Menilai • Mencipta	• Mengingat & Memahami • Mengaplikasi • Menganalisis • Menilai • Mencipta
6	Tempoh Ujian	2 jam	2 jam 30 minit
7	Cakupan Konstruk	Standard kandungan dan standard pembelajaran dalam Dokumen Standard Kurikulum dan Pentaksiran (DSKP) KSSM (Tingkatan 4 dan Tingkatan 5)	
8	Aras Kesukaran	Rendah : Sederhana : Tinggi 5 : 3 : 2	
9	Kaedah Penskoran	Analitik	
10	Alatan Tambahan	Kalkulator saintifik yang tidak boleh diprogram	

List of Formula

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

2 $\log_a b = \dfrac{\log_c b}{\log_c a}$

3 $T_n = a + (n-1)d$

4 $T_n = ar^{n-1}$

5 $S_n = \dfrac{n}{2}[2a + (n-1)d]$

6 $S_n = \dfrac{a(r^n - 1)}{r-1} = \dfrac{a(1 - r^n)}{1-r}$, $r \neq 1$

7 $Z = \dfrac{X - \mu}{\sigma}$

8 $P(X = r) = {}^nC_r\, p^r q^{n-r}$, $p + q = 1$

9 ${}^nP_r = \dfrac{n!}{(n-r)!}$

10 ${}^nC_r = \dfrac{n!}{(n-r)!\,r!}$

11 $I = \dfrac{Q_1}{Q_0} \times 100$

12 $\bar{I} = \dfrac{\sum W_i I_i}{\sum W_i}$

13 $\sin^2 A + \cos^2 A = 1$
$sin^2 A + kos^2 A = 1$

14 $\sec^2 A = 1 + \tan^2 A$
$sek^2 A = 1 + tan^2 A$

15 $\operatorname{cosec}^2 A = 1 + \cot^2 A$
$kosek^2 A = 1 + kot^2 A$

16 $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$
$sin(A \pm B) = sin\,A\,kos\,B \pm kos\,A\,sin\,B$

17 $\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$
$kos(A \pm B) = kos\,A\,kos\,B \mp sin\,A\,sin\,B$

18 $\tan(A \pm B) = \dfrac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$

19 $\sin 2A = 2 \sin A \cos A$
$sin\,2A = 2\,sin\,A\,kos\,A$

20 $\cos 2A = \cos^2 A - \sin^2 A$
$= 2\cos^2 A - 1$
$= 1 - 2\sin^2 A$

$kos\,2A = kos^2 A - sin^2 A$
$= 2\,kos^2 A - 1$
$= 1 - 2\,sin^2 A$

21 $\tan 2A = \dfrac{2\tan A}{1 - \tan^2 A}$

22 $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

23 $a^2 = b^2 + c^2 - 2bc\cos A$
$a^2 = b^2 + c^2 - 2bc\,kos\,A$

24 Area of triangle / *Luas segi tiga*
$= \dfrac{1}{2}ab\sin C$

List of Form 4 Chapter in Additional Mathematics KSSM.

Chapter 1	Functions
Chapter 2	Quadratic Functions
Chapter 3	System of Equations
Chapter 4	Indices, Surds and Logarithms
Chapter 5	Progressions
Chapter 6	Linear Law
Chapter 7	Coordinate Geometry
Chapter 8	Vectors
Chapter 9	Solutions of Triangles
Chapter 10	Index Numbers

Chapter 1: Function

Question 1.1

Given $f : x \to 3x - 2$ and $g : x \to \frac{x}{5} + 1$, find

(a) $f^{-1}(x)$

(b) $f^{-1}g(x)$

(c) $h(x)$ such that $hg(x) = 2x + 6$

Answer

Question 1.2

Diagram 1.1 shows that function h maps x onto y and function g maps y onto z.

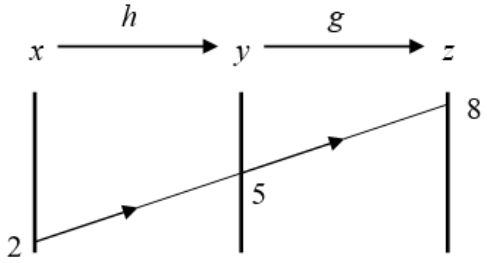


Diagram 1.1

Calculate

(a) $h^{-1}(5)$,

(b) $gh(2)$.

Answer

Question 1.3

Diagram 1.1 show the graph of function $f(x) = |3x + p|$ for the domain $0 \le x \le 6$.

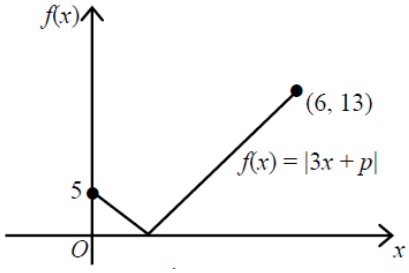


Diagram 1.2

State

a) the value of p

b) the range of $f(x)$ corresponding to the given domain.

Answer

Chapter 2: Quadratic Function

Question 2.1

Diagram 2 shows the graph of the function $y = -(x+1)^2 + 9$, where m is a constant. The curve touches the line $y = m$ at point A and cut the y-axis at point B. The curve also cut the x–axis at point P.

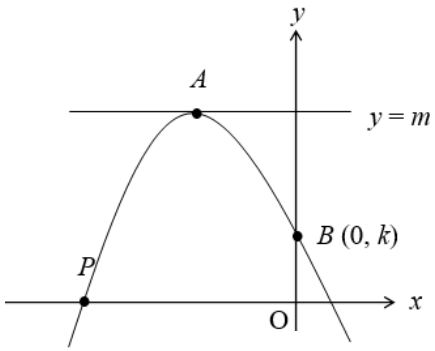


Diagram 2.1

a) Determine the value of m and of k.
b) State the coordinates of point P.

Answer

Question 2.2
It is given that the curve $y = x^2 - 2x$ intersect with the line $y = 9(2x - 5) - 5p$, where p is a constant at two points. Find the range of values of p.
Answer
Question 2.3
Graph of quadratic function $g(x) = -4 + hx - x^2$ has maximum point (k, -3) where $h > 0$ and k > 0. a) by using completing the square, find the value of h and k. b) hence, sketch graph of corresponding function $f(x)$
Answer

Chapter 3: System of Equations

Question 3.1

Solve the following linear equations system.

$$5x+10y+15z=32$$
$$10x+15y+20z=46$$
$$20x+35y+30z=82$$

Answer

Question 3.2
Solve the simultaneous equations $q-4p+20=0$ and $4p^2-8p-4pq+q^2-16=0$
Answer

Chapter 4: Indices, Surd & Logarithms

Question 4.1

Show that $3(2^n)+(2^{n+3})+2^{n+2}$ is divisible by 5 for all the positive integer values of n.

Hence, solve $3(2^n)+(2^{n+3})+2^{n+2}=3$.

Answer

Question 4.2
Given $\left(11+\sqrt{3}\right)-\left(\frac{13}{\sqrt{3}+4}\right)^2 = a+b\sqrt{3}$ where a and b are integers. Find the value of a and b.
Answer

Question 4.3
Solve $\log_2 \sqrt{x} - \log_4 3 = \frac{3}{2}$
Answer

Chapter 5: Progressions

Question 5.1

It is given that $x+4, x-2$ and $x-5$ are three consecutive terms of a geometric progression.
Find :

(a) the value of x.

(b) the first term if $\frac{3}{x}$ is the tenth term of the progression.

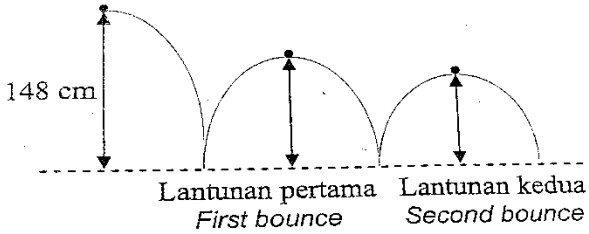
(c) sum of the first 5 terms

Answer

Question 5.2
In arithmetic progression, the sum of the first four terms is 36 and the sixth terms is -5. Find the value of the first term and the common difference of the progression.
Answer

Question 5.3

Hazim drops a tennis ball 148 cm vertically upwards from the floor. After the first bounce, the tennis ball reaches a height of $\frac{3}{4}$ from its previous distance from the floor as shown in diagram below. The tennis ball continues bouncing until it stops.



Find

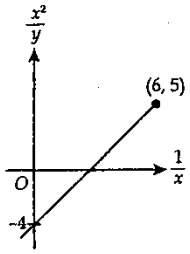
a) the maximum height of the tennis ball from the floor is less than 12 cm for the first time.
b) the total distance, in cm, travelled by the tennis ball from the first bounce until it stops.

Answer

Chapter 6: Linear Law

Question 6.1

Diagram below shows a straight line graph obtained by plotting $\frac{x}{y^2}$ against $\frac{1}{x}$.



Express y in terms of x

Answer

Question 6.2

Table below shows the values of two variables, x and y, obtained from an experiment. The variables x and y are related by the equation $y = \frac{2p}{t^x}$, where p and t are constants.

x	4	6	8	10	12	14
y	2.5	1.86	1.38	1.04	0.78	0.59

(a) Based on Table above, construct a table for the value of $\log_{10} y$. Give your answer correct to two significant figures.

(b) Plot $\log_{10} y$ against x, using a scale of 2 cm to 2 units on the $x-axis$ and 2 cm to 0.1 unit on the $\log_{10} y - axis$. Hence draw the line of best fit.

(c) Use the graph in (b) to find the value of

i. t

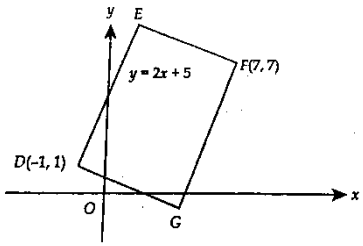
ii. p

Answer

Chapter 7: Coordinate Geometry

Question 7.1

Diagram below shows a quadrilateral $DEFG$. The equation of the straight line DE is $y = 2x + 5$.



Find

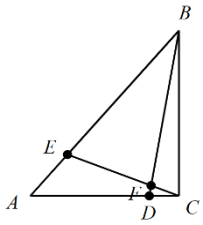
a) the equation of the straight line GF.
b) the equation of the straight line DG.
c) the coordinates of G
d) the area, in unit², of the quadrilateral $DEFG$

Answer

Chapter 8: Vector

Question 8.1

Diagram shows triangle ABC. The point D lies on the straight line AC and the point E lies on the straight line AB. The straight line BD intersects the straight line CE at the point F.



Given that $\angle ACB = 90°$, $\overrightarrow{AC} = 14\underset{\sim}{x}$, $\overrightarrow{CB} = 16\underset{\sim}{y}$, $\overrightarrow{AC} : \overrightarrow{DC} = 5 : 1$ and $\overrightarrow{AB} : \overrightarrow{AE} = 4 : 1$.

a) Express in terms of $\underset{\sim}{x}$ and $\underset{\sim}{y}$.

   i. $\overrightarrow{BD}$

   ii. $\overrightarrow{CE}$

b) Given that $\overrightarrow{CF} = h\overrightarrow{CE}$ and $\overrightarrow{BF} = k\overrightarrow{BD}$, where h and k are constants, find the value of h and of k.

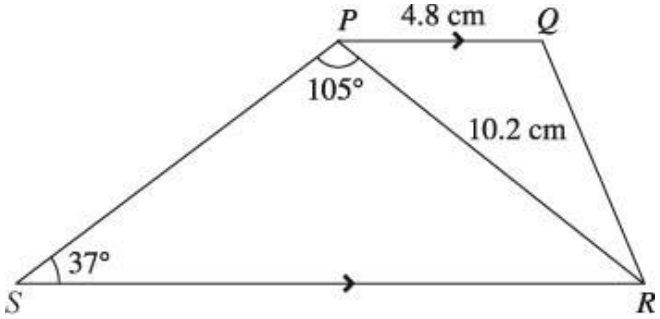
c) Given that $|\underset{\sim}{x}| = 2$ units and $|\underset{\sim}{y}| = 4$ units, find $|\overrightarrow{AB}|$.

Answer

Chapter 9: Solution of Triangle

Question 9.1

Diagram shows a trapezium $PQRS$ where PQ is parallel to RS. Given that PQ = 4.8 cm, PR = 10.2 cm, $\angle SPR$ = 105°, and $\angle PSR$ = 37°, calculate



a) the length of PS

b) the length of QR

c) the area of trapezium $PQRS$.

Answer

Chapter 10: Index Number

Question 10.1

Table below shows the price indices and weightages for four stationery items *P*, *Q*, *R* and *S*.

Stationery *Alat tulis*	Price (RM) per unit *Harga (RM) seunit*		Price Index for the year 2014 based on the year 2013 *Indeks harga pada tahun 2014 berasaskan tahun 2013*	Weightage *Pemberat*
	Year 2013 *Tahun 2013*	Year 2014 *Tahun 2014*		
P	2.80	*x*	80	5
Q	4.00	4.80	120	1
R	*y*	2.60	130	2
S	5.00	5.85	*z*	*m*

a) Find the values of *x*, *y* and z.

b) The composite index for the price of the stationery in the year 2014 based on the year 2013 is 104. Calculate the value of *m*.

c) The total expenditure for the stationery in the year 2013 is RM640. Calculate the corresponding total expenditure in the year 2014.

d) The price index for *Q* in the year 2015 based on the year 2013 is 158.4. Calculate the price index for *Q* in the year 2015 based on the year 2014.

Answer