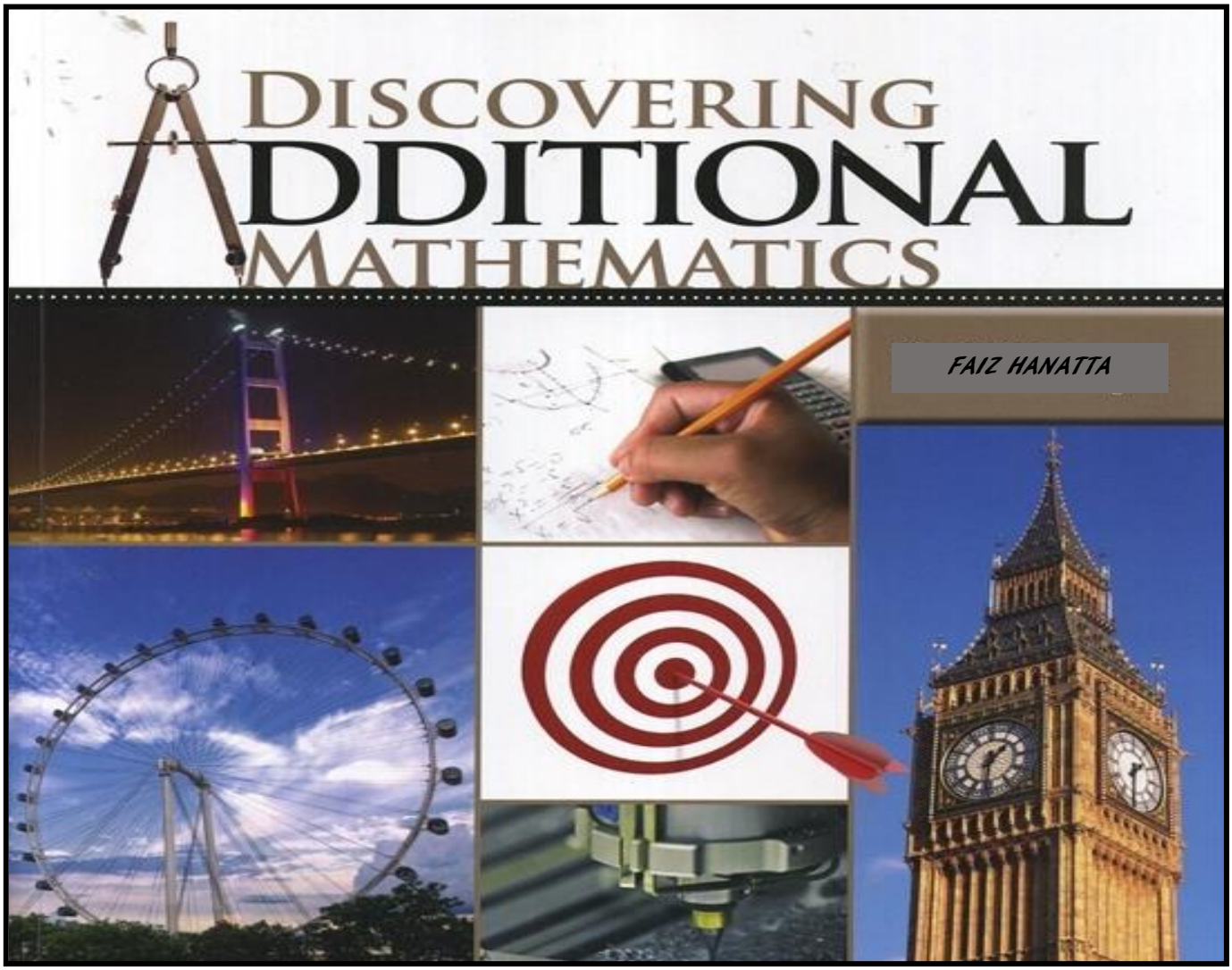
MODUL KBAT SPM



PRACTICE & REVISION FOR A+ IN ADDITIONAL MATHEMATICS

KOLEKSI SOALAN-SOALAN KBAT

PERCUBAAN SPM TAHUNAN

Spirit of Math schools

TABLE OF CONTENT

MODUL KBAT SPM

ADDITIONAL MATHEMATICS

FORM 5

"MATHEMATICS IS MY SOUL, ADDITIONAL MATHEMATICS IS MY PASSIONS"

MODUL KBAT SPM

Depth of Knowledge

- Level 1: Recall and Reproduction
- Level 2: Basic skills and concepts
- Level 3: Strategic thinking and reasoning
- Level 4: Extended thinking

PAPER 1

QUESTION 1:

CHAPTER: _____

Diagram 1 shows a sketch of a lunging route taken by Johnny and his horse, Black Beauty drawn on a Cartesian Plane.

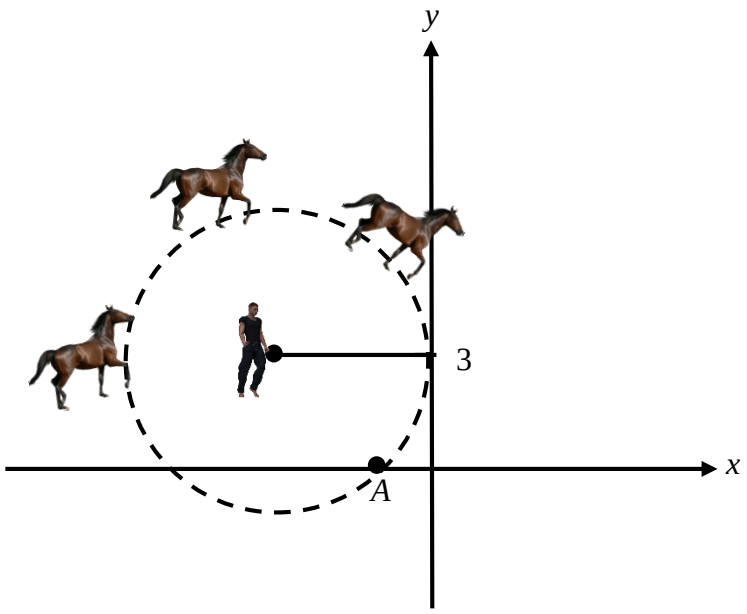


Diagram 1

Lunging is a method used to exercise a horse or to teach him something new without a rider on his back. When lunging, the owner stands approximately still and the horse moves in a circle around him. Every morning, Johnny lunge his horse to help maintains the horse's fitness. During the lunging, Johnny always stands 4 meters from his horse. During his exercise, Black Beauty will stop at point *A* for a drink.

Find the position *A* in Cartesian coordinate form.

[4 marks]

QUESTION 2:

CHAPTER: _____

During the Homeroom Festival, homeroom committee announces a special award which is Anugerah Homeroom Terbilang. The reward is based on the points collected using merit and demerit system. The point collected is normally distributed with the standard deviation of 5000 and mean 10000. After some judgment, it is found that 20% of the homeroom qualifies for the Anugerah Terbilang Homeroom.

Diagram 1 show the data of two homeroom picked randomly.

ELITE 5	**HONEST 4**
• Merit : 25,500 • Demerit : 4,300	• Merit : 16,110 • Demerit : 980

Diagram 1

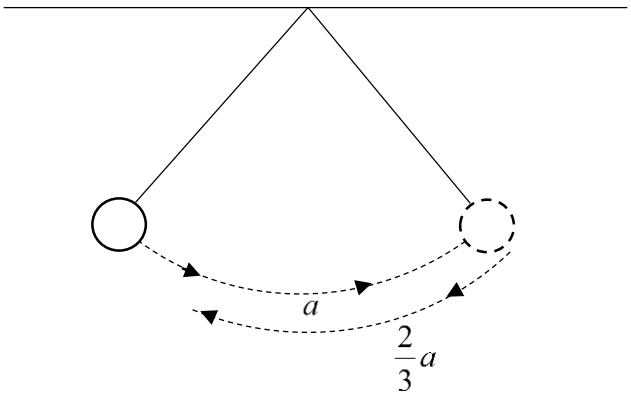
Determine whether these two homerooms qualify for the Anugerah Homeroom Terbilang.

QUESTION 3:

CHAPTER: _____

Jarak hayunan pertama bandul ialah 18m. Disebabkan faktor rintangan udara dan graviti, jarak laluan hayunan bandul akan berkurangan kepada 2/3 daripada jarak hayunan sebelumnya. Berapakah sudut yang dicakupi oleh bandul pada hayunan ke-4 sekiranya nisbah perimeter sektor hayunan ke-2 kepada perimeter sektor hayunan ketiga ialah 11 : 9.

[4 MARKS]



QUESTION 4:

CHAPTER: _____

Diagram 4 shows that Fahmi is training the penalty kick in a football game.

Rajah 4 menunjukkan Fahmi sedang membuat latihan sepakan penalti dalam suatu permainan bola sepak.

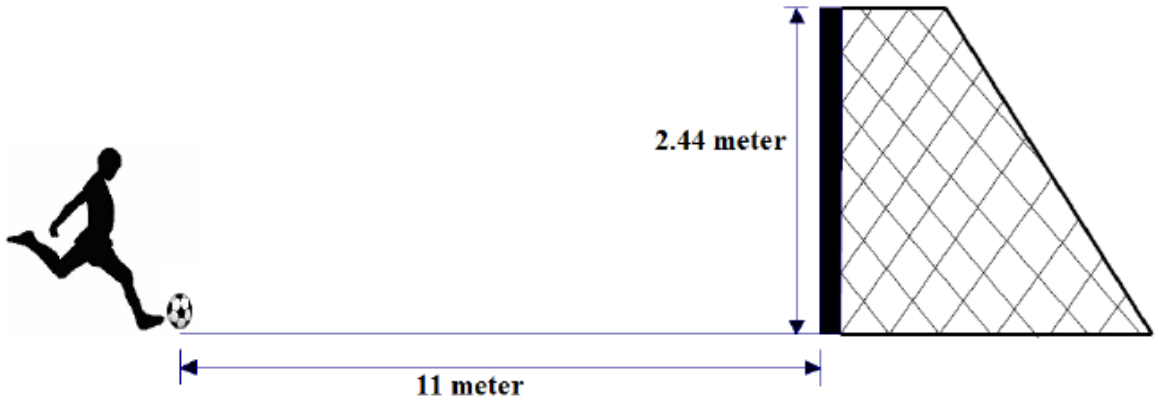


Diagram 4

Rajah 4

The moving ball formed a curve represented by the equation $y = -\frac{3}{121}\left[x^2 - 22x\right]$. If the moving ball passes through the shortest distance to the goal post, determine whether Fahmi scores the goal or not, show your calculation.

Pergerakan bola itu membentuk satu lengkung yang diberi oleh fungsi $y = -\frac{3}{121}\left[x^2 - 22x\right]$. *Jika pergerakan bola itu melalui jarak terpendek ke pintu gol, tentukan dengan kiraan, adakah bola yang disepak oleh Fahmi akan masuk ke dalam gol atau tidak.*

[4 *marks*]

QUESTION 5:

CHAPTER: _____

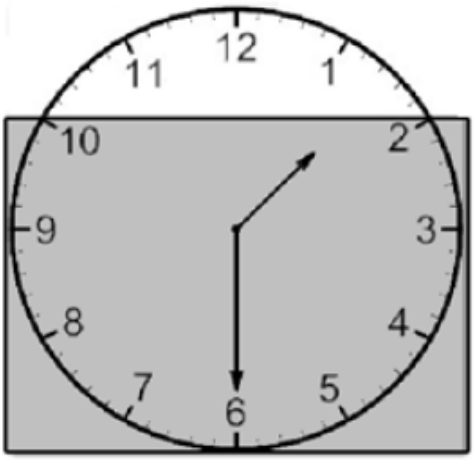


Diagram 22
Rajah 22

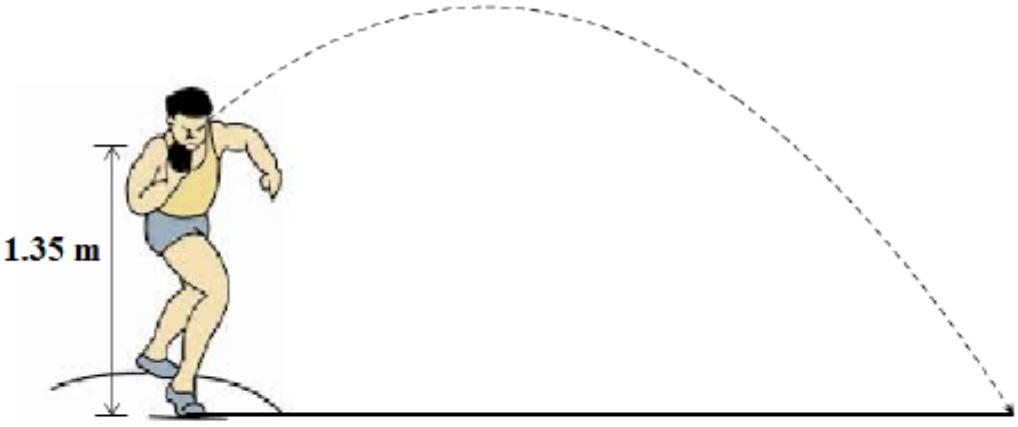
Diagram 22 shows a clock inside a glass box. The diameter of the clock is 24 cm and a part of the clock is out of the box. Calculate the area of the clock that is out of the box.

Diagram 22 menunjukkan sebuah jam yang diletakkan di dalam kotak kaca. Diameter jam tersebut ialah 24 cm. *Sebahagian daripada jam tersebut berada di luar daripada kotak. Hitungkan luas jam yang berada di luar daripada kotak kaca.*

[4 *marks*]

QUESTION 6:

CHAPTER: _____



Amirul represented SMK Sri Putra in a shot putt event in the District Sports Competition. The function for the curve formed by the movement of the putt is $f(x) = -x^2 + 4x - 3$.

Calculate the maximum height of the putt from the surface of the field.

Amirul mewakili SMK Sri Putra dalam acara lontar peluru dalam Kejohanan Olahraga Peringkat Daerah. Fungsi bagi lengkung yang dibentuk oleh pergerakan peluru tersebut adalah $f(x) = -x^2 + 4x - 3$.

Hitung ketinggian maksimum peluru tersebut dari permukaan padang.

[3 *marks*]

QUESTION 7:

CHAPTER: _____

Formula One Junior has provided a track for control car game as shown in Diagram 15.
Formula One Junior telah menyediakan satu landasan permainan kereta kawalan seperti ditunjukkan dalam Rajah 15.

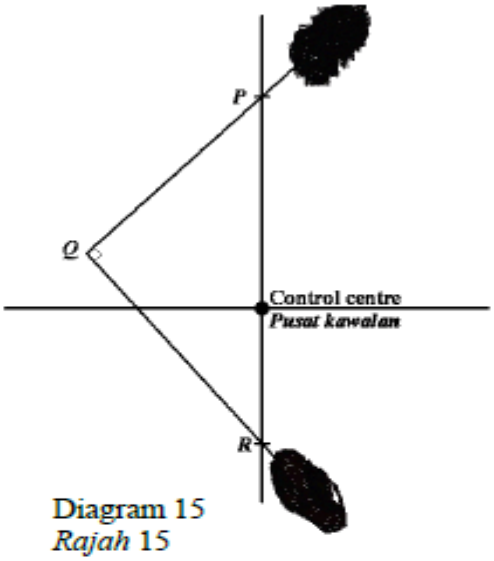


Diagram 15
Rajah 15

Peter gets ready at P which is 6 meter from the control centre while Ramli gets ready at R. Peter and Ramli start the game simultaneously and the control cars move along the straight line and meet at Q. Given the equation of straight line QR is $y=-3x-4$.
Find the coordinates of point Q.

Peter berada 6 *meter dari pusat kawalan di P manakala Ramli berada di titik R. Peter dan Ramli memulakan permainan secara serentak dan kereta kawalan itu bergerak secara lurus dan bertemu di Q. Diberi persamaan bagi garis lurus QR ialah* $y=-3x-4$.
Cari koordinat bagi titik Q.

[3 *marks*]

QUESTION 8:

CHAPTER: _____

Diagram 22 shown an analog clock installed in the school hall.
Rajah 22 menunjukkan sebuah jam analog yang dipasang di dalam dewan sekolah.

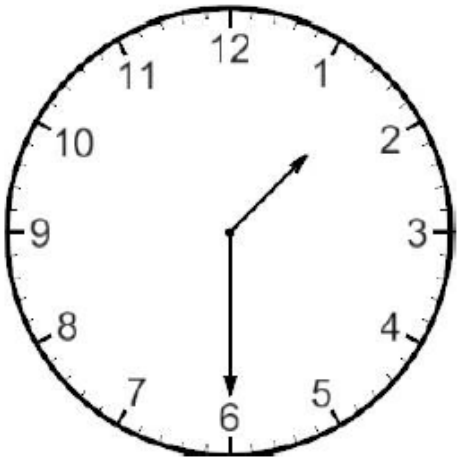


Diagram 22
Rajah 22

The length of the minute hand is 7 cm. If the minute hand moves from 1.30 p.m to 1.50 p.m, what is the distance traveled by the tip of the minute hand?

Panjang jarum minit jam tesebut adalah 7 cm. *Jika jarum minit bergerak dari pukul* 1.30 *petang hingga pukul* 1.50 *petang, berapakah jarak yang dilalui oleh hujung jarum minit tersebut?*

[3 *marks*]

QUESTION 9:

CHAPTER: _____

Alfred bought an apartment with price RM 180 000 in year 2015. If the price for the apartment increase 9% per year from the buying price. In which year the price of the apartment will increase more than two times the original price?

[3 marks]

Alfred telah membeli sebuah pangsapuri dengan harga RM 180 000 *pada tahun* 2015. *Jika harga pangsapuri tersebut meningkat sebanyak* 9% *setiap tahun daripada harga belian tersebut. Pada tahun ke berapakah harga pangsapuri tersebut meningkat sebanyak* 2 *kali ganda harga asalnya*?

[3 *markah*]

QUESTION 10:

CHAPTER: _____

Diagram 18 , *PQRS* is a rectangle. *T* is a point on *PR* such that $PR = 4\,PT$.

Dalam Rajah 18, *PQRS ialah sebuah segi empat tepat. T ialah satu titik pada QR dengan* $PR = 4PT$.

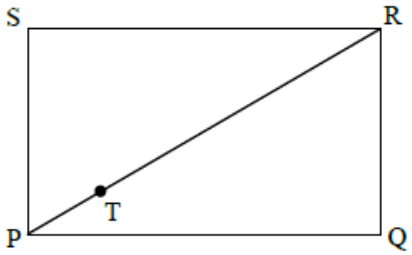


Diagram 18

Rajah 18

Given that $\overrightarrow{PQ} = 12\,\underset{\sim}{x}$ and $\overrightarrow{PR} = 12\underset{\sim}{x} + 5\underset{\sim}{y}$, express the following vectors in the terms of $\underset{\sim}{x}$ and/or $\underset{\sim}{y}$.

Diberi $\overrightarrow{PQ} = 12\,\underset{\sim}{x}$ *dan* $\overrightarrow{PR} = 12\underset{\sim}{x} + 5\underset{\sim}{y}$, *ungkapkan vektor yang berikut dalam sebutan* $\underset{\sim}{x}$ dan/atau $\underset{\sim}{y}$.

(*a*) $\overrightarrow{PS}$,

(*b*) $\overrightarrow{QT}$.

[4 *marks*]

QUESTION 11:

CHAPTER: _____

A boy is standing in the middle of a 5-step staircase, as in Diagram 23. He moves up or down the stairs depending on the outcome of tossing a fair coin.

Seorang budak berdiri di tengah-tengah sebuah tangga yang mempunyai 5 anak tangga, seperti dalam Rajah 23. Dia menaiki atau menuruni tangga itu berdasarkan kepada kesudahan yang diperoleh dengan melambung sekeping duit syiling yang adil.

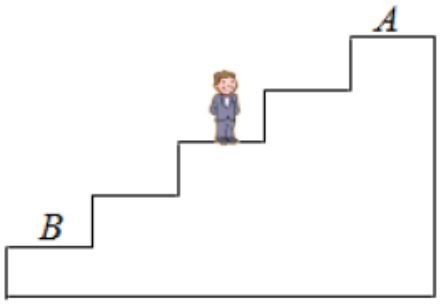


Diagram 23
Rajah 23

The boy moves one step up the stairs when the outcome is 'heads' and moves one step down when the outcome is 'tails'. Find the probability that, after two tosses of the coin, he is

Budak itu naik satu anak tangga apabila 'gambar' diperoleh dan turun satu anak tangga apabila 'angka' muncul. Cari kebarangkalian bahawa, selepas duit syiling dilambung dua kali, budak itu

(*a*) *at A*, the top of the stairs,
berada di A, anak tangga paling atas,

(*b*) remains at the same place.
berada pada tempat yang sama.

[4 marks]

QUESTION 12:

CHAPTER: _____

A rectangular table in a restaurant has 4 seats on one side and 3 seats on the opposite side, as shown in Diagram 24.

Sebuah meja berbentuk segi empat tepat di sebuah restoran dilengkapi dengan 4 buah kerusi di satu belah dan 3 buah kerusi di sebelah yang bertentangan, seperti ditunjuk dalam Rajah 24.

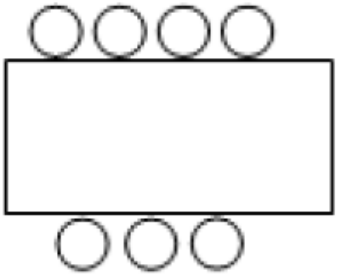


Diagram 24/*Rajah* 24

A family of 7, consisting of 2 grandparents, 2 parents and 3 children are to be seated at this table for dinner. In how many ways can they be seated if the grandparents and parents are seated together and at opposite sides of the table.

Sebuah keluarga seramai 7 orang, iaitu datuk, nenek, bapa, ibu dan tiga orang anak, menggunakan meja ini untuk makan malam. Berapakah cara mereka dapat ditempatkan jika datuk nenek duduk bersama dan bertentangan dengan ibu dan bapa yang duduk bersama.

[3 marks]

QUESTION 13:

CHAPTER: _____

Tiga pesawat tentera P, Q dan R berpengkalan di koordinat O. Pesawat P terbang ke arah Utara O sejauh 1500 km manakala Pesawat Q terbang ke arah Tenggara O. Pesawat R pula terbang dari O ke arah bertentangan dengan Pesawat Q sejauh dua kali jarak Pesawat Q dari O. Pergerakan tiga pesawat ini dapat digambarkan pada suatu satah cartes dengan skala 1 unit mewakili 500 km. Diberi pergerakan Pesawat P dan Q masing-masing diwakili oleh vektor $\underset{\sim}{p} = 3\underset{\sim}{j}$ dan $\underset{\sim}{q} = 3\underset{\sim}{i} - 3\underset{\sim}{j}$.

(*a*) (*i*) Pada paksi dan satah cartes di ruang jawapan di bawah, lakarkan dengan tepat arah Pesawat Q ke Pesawat P.

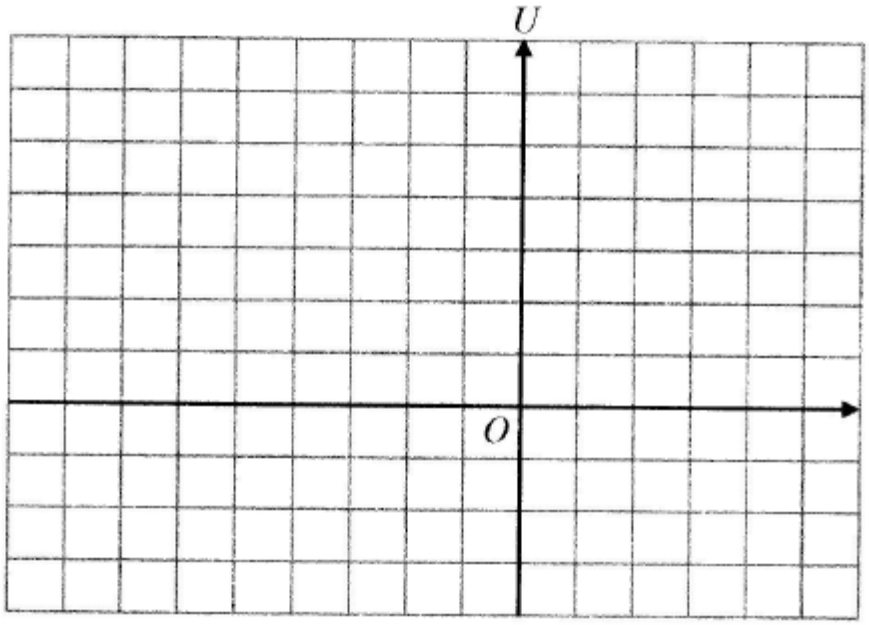
(*ii*) Nyatakan vektor paduan arah $\overrightarrow{QP}$ dalam sebutan $\underset{\sim}{i}$ dan $\underset{\sim}{j}$.

(*b*) Hitungkan jarak sebenar lokasi Pesawat R dari Pesawat P. Beri jawapan anda kepada kilometer terdekat.

[4 *markah*]

Jawapan :

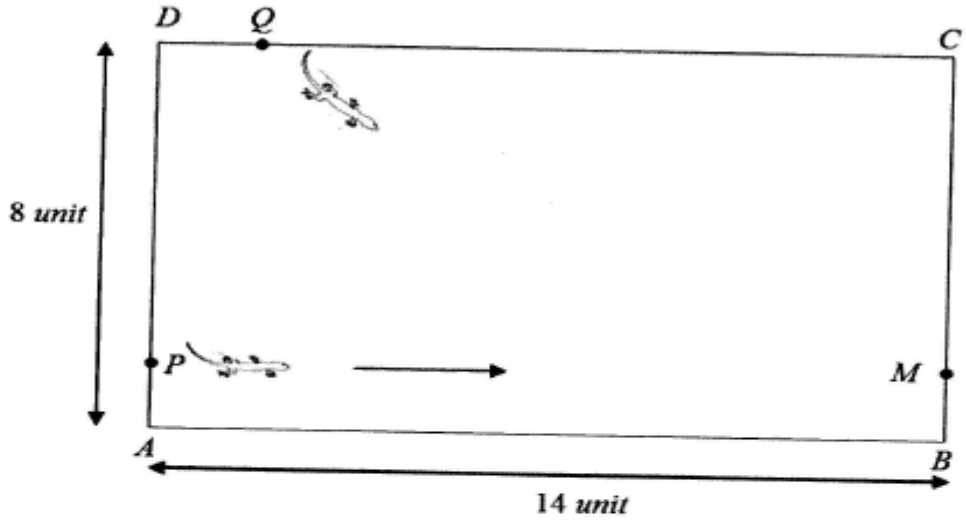
(*a*) (*i*)



QUESTION 14:

CHAPTER: _____

Rajah 25 menunjukkan dua ekor cicak berada di kedudukan P dan Q di sebuah dinding rumah berbentuk segi empat tepat $ABCD$. Cicak-cicak itu ingin menangkap seekor serangga yang berada pada kedudukan M.



Rajah 25

Panjang sisi AB adalah 14 unit mewakili paksi-x dan panjang sisi AD adalah 8 unit mewakili paksi-y. Jarak tegak P dari A adalah sama dengan jarak tegak M dari B iaitu 2 unit.

a) Nyatakan persamaan lokus cicak pada kedudukan P yang bergerak secara malar untuk menangkap serangga.

b) Cicak pada kedudukan Q juga ingin menangkap serangga tersebut, di mana koordinat Q (2, 8). Tunjukkan dengan kiraan, cicak yang berada di kedudukan manakah yang akan dapat menangkap serangga itu terlebih dahulu jika kedua-dua ekor cicak itu bergerak dengan kelajuan yang sama.

[3 *markah*]

QUESTION 15:

CHAPTER: _____

Diagram 7 shows a circular ripple spreads across a pool.
Rajah 7 menunjukkan suatu riak bulatan merebak secara menyeluruh di sebuah kolam.

Diagram 7
Rajah 7

Given that the area of the ripple is increasing at a rate of 12π m^2 s^{-1}. Find the rate of change of the radius of the ripple at the instant when the area of the ripple is 4π m^2.
[3 *marks*]

Diberi bahawa luas riak bertambah dengan kadar 12π m^2 s^{-1}. *Cari kadar perubahan jejari riak pada ketika luas riak ialah* 4π m^2.
[3 *markah*]

QUESTION 16:

CHAPTER: _____

Diagram 8 shows a major segment of a circular manhole cover with centre *O* and radius of 30 cm.
Rajah 8 menunjukkan tembereng major bagi suatu penutup lurang bulatan berpusat O dan berjejari 30 cm.

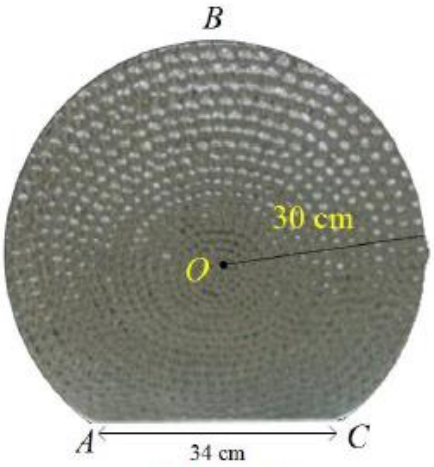


Diagram 8
Rajah 8

Given that the cover is hinged at chord *AC* which is 34 cm in length.
Diberi penutup tersebut diengsel pada perentas AC yang panjangnya 34 cm.

Use/*Guna* $\pi = 3.142$

Find/ *Cari*

(*a*) the length, in cm, of the arc *ABC*,
panjang, dalam cm, *lengkok ABC,*

(*b*) the surface area, in cm^2, of the manhole cover.
luas permukaan, dalam cm^2, *penutup lurang itu.*

[4 *marks*]

QUESTION 17:

CHAPTER: _____

Diagram 14 shows a movement of a fish jumping out from the surface of water. The movement of the fish starts at point *O*, reaches the highest point *H* and ends at point *E*.

Rajah 14 menunjukkan pergerakan seekor ikan melompat keluar dari permukaan air. Gerakan ikan tersebut bermula di titik O, telah mencapai ketinggian maksimum pada titik H dan berakhir di titik E.

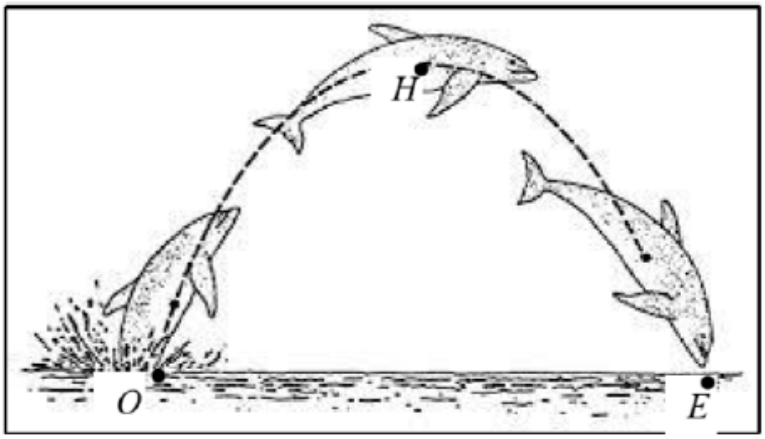


Diagram 14/ *Rajah* 14

Given that the movement of the fish is represented by function $f(x) = -\frac{3}{100}(x-50)^2 + p + 30$

and point *H* is 75 cm from the surface of water.

Diberi bahawa pergerakan ikan tersebut diwakili oleh fungsi $f(x) = -\frac{3}{100}(x-50)^2 + p + 30$

dan titik H ialah 75 cm dari permukaan air.

Find

Cari

(a) the value of *p*.

nilai p.

(b) the distance of *OE*, in cm.

jarak OE, dalam cm.

[3 marks/*markah*]

QUESTION 18:

CHAPTER: _____

Diagram 1 shows a cultivation plan of jackfruit saplings on a trapezium-shaped plot of land belong to Mr. Shuhaimi. According to the plan, first line can be planted 8 saplings and the next line increase by 2 saplings.
Rajah 1 *menunjukkan pelan penanaman anak pokok nangka di atas sebidang tanah berbentuk trapezium kepunyaan Encik Shuhaimi. Berdasarkan pelan tersebut, baris pertama dapat ditanam* 8 *anak pokok dan baris berikutnya bertambah sebanyak* 2 *anak pokok.*

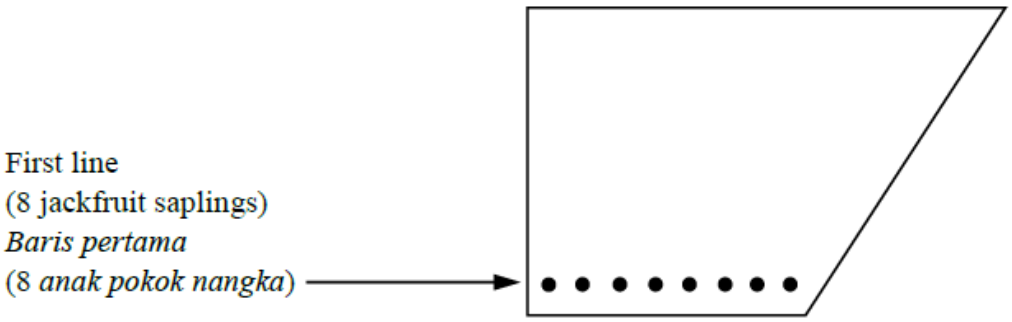


Diagram 1 / *Rajah* 1

Find the number of jackfruit saplings must be bought by Mr. Shuhaimi if only 14 line can be planted by him.
Cari bilangan anak pokok nangka yang perlu dibeli oleh Encik Shuhaimi jika hanya 14 *baris sahaja dapat ditanam oleh beliau.*

[2 *marks* / *markah*]

QUESTION 19:

CHAPTER: _____

Diagram 5(a) shows a duck livestock farm belong to Mr. Rizuan. He plans to build a rectangular fence with area more than 20 m^2 as sketch plan on Diagram 5(b).

Rajah 5(a) *menunjukkan sebuah ladang ternakan itik kepunyaan Encik Rizuan. Dia bercadang untuk membina pagar berbentuk segi empat tepat dengan keluasan melebihi* 20 m^2 *seperti lakaran pelan Rajah* 5(b).

Diagram 5(a) / *Rajah* 5(a)

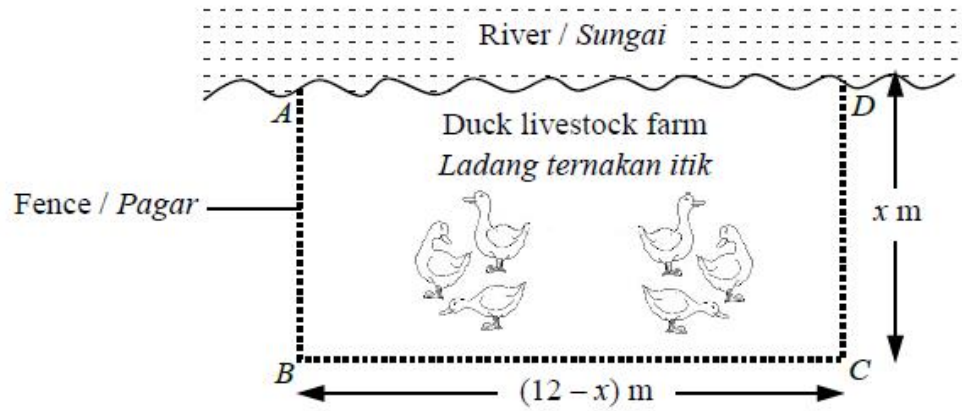


Diagram 5(b) / *Rajah* 5(b)

Find the range of x.
Cari *julat nilai* x.

[4 *marks* / *markah*]

QUESTION 20:

CHAPTER: _____

Eyrin trained to participate in a marathon run. She found that on average she took 3 minutes 25 seconds for the first kilometre. Her running time is increased constantly, 2 percents more than the previous kilometre.
Eyrin berlatih untuk menyertai pertandingan larian dalam acara marathon. Dia mendapati bahawa secara purata dia mengambil masa sebanyak 3 minit 25 saat bagi kilometer pertama. Masa lariannya bertambah dengan seragam, sebanyak 2 peratus lebih daripada kilometer sebelumnya.

Diagram 4
Rajah 4

Diagram 4 shows the promotional poster of the running event participated by Eyrin.
Rajah 4 menunjukkan poster promosi pertandingan larian yang disertai oleh Eyrin.

(*a*) List the time taken for the first three kilometres, in seconds.
Senaraikan catatan masa yang diambil bagi tiga kilometer yang pertama, dalam saat.

(*b*) Calculate the time taken to complete the run.
Kira masa yang diambil untuk menghabiskan larian itu.

[3 *marks*]

QUESTION 21:

CHAPTER: _____

An architect is given a task to design a stage for the use of a television show by using a circle as its design concept.
Seorang arkitek diberi tugasan mereka bentuk pentas untuk kegunaan sebuah rancangan televisyen dengan menggunakan bulatan sebagai konsep rekaannya.

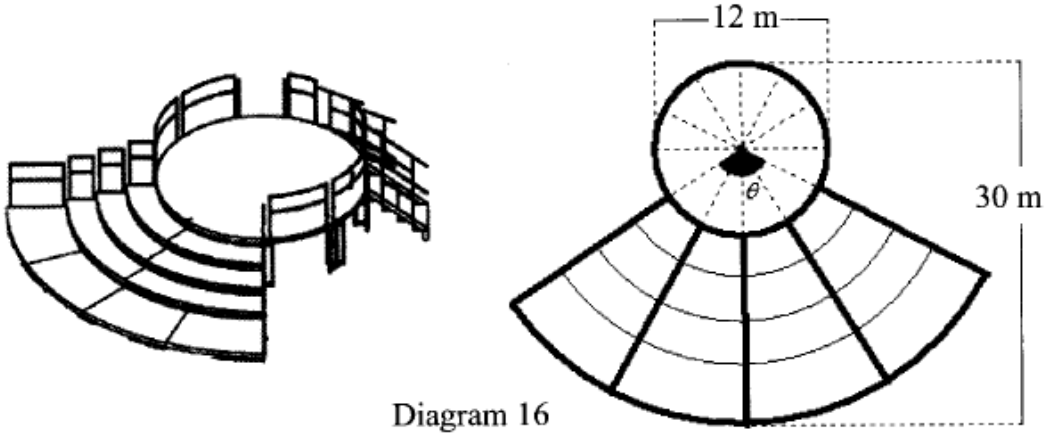


Diagram 16
Rajah 16

Diagram 16 shows the initial plan of the stage. The main stage diameter is 12 metres and the overall width of the stage is 30 metres. The architect divides the angle of the main stage circle equally into 12 sectors and four sectors are extend as steps.
Rajah 16 *menunjukkan pelan awal pentas tersebut. Diameter pentas utama ialah* 12 *meter dan lebar keseluruhan pentas ialah* 30 *meter. Arkitek tersebut membahagi sama sudut bulatan pentas utama kepada* 12 *bahagian yang sama besar dan empat sektor tersebut dipanjangkan sebagai tangga.*
[Use/ *Guna,* $\pi = 3.142$]

Find / *Cari*

(*a*) the value of θ, in radian,
nilai bagi θ, *dalam radian,*

(*b*) the area of steps.
keluasan tangga.

[4 *marks*]

QUESTION 22:

CHAPTER: _____

Diagram 25 shows a parallelogram $ABCD$ with vertices A, B, C and D drawn on a Cartesian plane.
Rajah 25 menunjukkan sebuah segi empat selari ABCD dengan bucu-bucu A, B, C dan D dilukis pada suatu satah Cartesan.

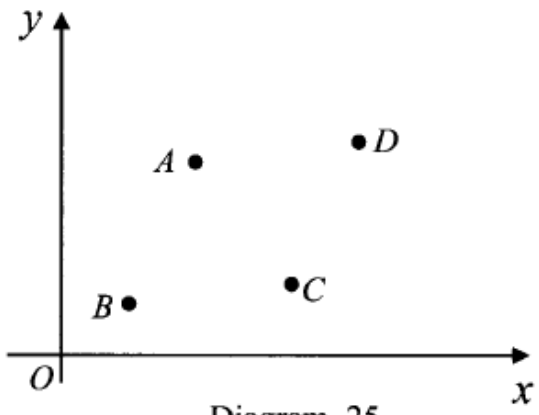


Diagram 25
Rajah 25

The position vectors of A, B, C and D relative to O are $3\underline{i}+4\underline{j}$, $2\underline{i}+\underline{j}$, $5\underline{i}+2\underline{j}$ and $6\underline{i}+5\underline{j}$. Given that point A' is the reflection of A in the $x-$axis and the points A', C and D are collinear such that $A'C = \lambda CD$.
Find the value of λ. [3 *marks*]

Vektor - vektor kedudukan bagi A, B, C dan D relatif kepada O ialah $3\underline{i}+4\underline{j}$, $2\underline{i}+\underline{j}$, $5\underline{i}+2\underline{j}$ *dan* $6\underline{i}+5\underline{j}$. *Diberi bahawa titik A' merupakan pantulan bagi A pada paksi – x dan titik- titik A', C dan D adalah segaris dengan keadaan* $A'C = \lambda CD$.
Cari nilai λ. [3 *markah*]

QUESTION 23:

CHAPTER: _____

Diagram 10 shows a bottle of liquid hand wash with based diameter 8 cm.The height of liquid inside the bottle is 22 cm.

Rajah 10 *menunjukkan sebuah botol cecair pencuci tangan dengan diameter* 8 cm. *Tinggi cecair di dalam botol tersebut ialah* 22 cm.

Diagram 10 / *Rajah* 10

Find the small changes of the volume of the bottle, in terms of π, if the small error in diameter is 0·2 cm.

Cari perubahan kecil dalam isi padu botol, dalam sebutan π, *jika ralat kecil bagi diameter ialah* 0·2 cm.

[3 *marks*]

QUESTION 24:

CHAPTER: _____

Diagram 17 shows a staircase with length 3.6 m, leans against a wall with height 3 m.

Rajah 17 *menunjukkan sebuah tangga dengan panjang* 3.6 m *yang disandarkan pada dinding setinggi* 3 *m.*

Diagram 17 / *Rajah* 17

Solve the equation $\sin k = \frac{cos\ y}{4cos\ k}$, for $0° \le k \le 360°$

Selesaikan persamaan $\sin k = \frac{kos\ y}{4kos\ k}$, *untuk* $0° \le k \le 360°$

[4 *marks*]

QUESTION 25:

CHAPTER: _____

Diagram 18 shows the position of a pendulum which swing from *A* to *B*.

Rajah 18 *menunjukkan kedudukan suatu bandul ringkas yang berayun dari A ke B.*

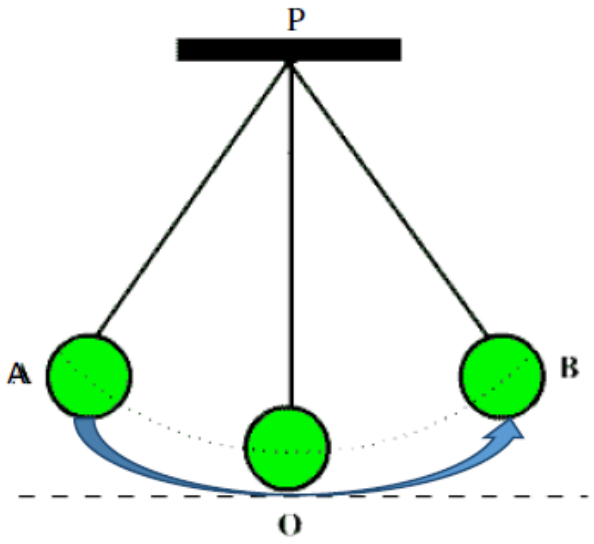


Diagram 18 / *Rajah* 18

If the $\angle APB$ is 0·52 rad and the length of the swing *AOB* is 15·6 cm, find area of the region swept by the pendulum.

Jika $\angle APB$ *ialah* 0·52 *rad dan panjang ayunan AOB ialah* 15·6 cm, *cari luas rantau yang dilalui oleh bandul itu.*

[3 marks]

QUESTION 26:

CHAPTER: _____

Diagram 21 shows five types of car brand Honda that are arranged in a row.

Rajah 21 *menunjukkan lima jenis kereta jenama Honda yang disusun secara sebaris.*

Diagram 21/ *Rajah* 21

(a) Calculate the number of ways the types of car can be arranged without restriction.

Hitung bilangan cara semua kereta itu boleh disusun tanpa sebarang batasan.

(b) If the Honda Civic and Honda Accord are not supposed to place side by side, calculate the number of ways that all cars can be arranged.

Jika Honda Civic dan Honda Accord tidak boleh diletakkan bersebelahan, hitung bilangan cara semua kereta itu boleh disusun.

[3 *marks*]

QUESTION 27:

CHAPTER: _____

Diagram 3 shows the arrangement of eight chairs in a room.
Rajah 3 menunjukkan susunan lapan buah kerusi di dalam sebuah bilik.

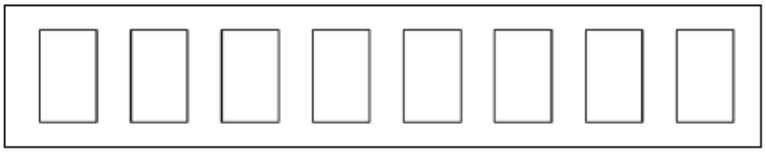


Diagram 3
Diagram 3

(a) Ali, Othman and Ridzuan came into the room and each occupied a chair, find the number of ways they can be seated.
Ali, Othman dan Ridzuan masuk ke dalam bilik dan setiap orang memenuhi sebuah kerusi, cari bilangan cara kedudukan mereka.

(b) If Abu and his wife also came into the room and they prefer to sit side by side, find the number of ways the five of them can be seated.
Jika Abu dan isterinya juga masuk ke dalam bilik itu dan mereka ingin duduk bersebelahan , cari bilangan cara kedudukan lima orang itu.

[3 *marks*]

QUESTION 28:

CHAPTER: _____

Diagram 6 shows a straw in a glass filled with orange juice. The volume of orange juice, $V\,\text{cm}^3$, in the glass is given by $V = \frac{1}{2}h^3 + h$, where h is the height of the juice in the glass. Amin uses the straw to drink the orange juice at a rate of $5\,\text{cm}^3\text{s}^{-1}$.

Rajah 6 menunjukkan sebatang penyedut minuman di dalam gelas berisi jus oren. Isi padu jus oren, $V\,\text{cm}^3$, dalam gelas itu diberi oleh $= \frac{1}{2}h^3 + h$, dengan keadaan h ialah tinggi jus di dalam gelas itu. Amin menggunakan penyedut minuman untuk minum jus dengan kadar $5\,\text{cm}^3s^{-1}$.

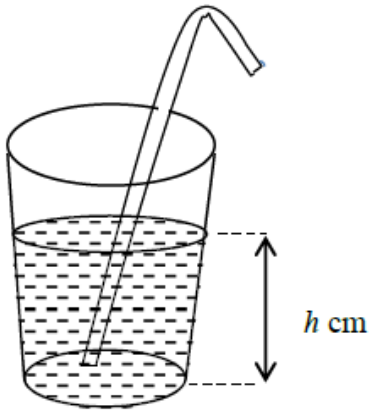


Diagram 6
Rajah 6

Find the height of the juice in the glass at the instant when the rate of change of the height of juice is $-0.2\,\text{cms}^{-1}$.

Cari tinggi jus dalam gelas itu pada ketika kadar perubahan tinggi jus ialah $-0.2\,\text{cms}^{-1}$.

[3 *marks*]

QUESTION 29:

CHAPTER: _____

Due to the high living cost, Kenny has planted several types of vegetables for his own consumption on an empty rectangular plot of land beside his house. He wants to fenced the land which has the dimension of $12x$ m and $(4 - x)$ m. Find the length, in m, of the fence he has to buy when the area of the land is maximum.

Akibat daripada peningkatan kos sara hidup, Kenny telah menanam beberapa jenis sayur untuk kegunaan sendiri di kawasan lapang berbentuk segi empat tepat di sebelah rumahnya. Dia ingin memagar kawasan itu yang berukuran $12x$ m *dan* $(4 - x)$ m. *Cari panjang, dalam* m, *pagar yang perlu dia beli apabila luas kawasan itu adalah maksimum.*

[4 *marks*]

QUESTION 30:

CHAPTER: _____

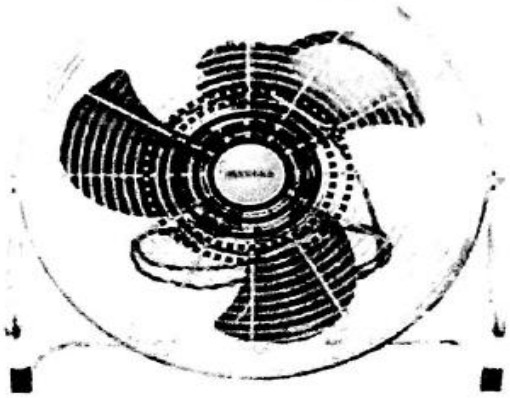


Diagram 8
Rajah 8

Diagram 8 shows an electric fan. Given that there are 15 circular coils on the lid of the electric fan and the radius of each coils will increased 1 cm. The total length of wire needed to produce a lid for the electric fan is 270π cm . Find the radius of the smallest coil on the lid of the electric fan.

[4 *marks*]

Rajah 8 *menunjukkan sebuah kipas angin elektrik. Diberi bahawa tudung kipas angin tersebut mempunyai* 15 *gegelung berbentuk bulatan dan jejari bagi setiap gegelung pada tudung kipas angin tersebut akan bertambah sebanyak* 1 cm. *Jumlah panjang dawai yang diperlukan untuk membuat satu tudung kipas angin tersebut ialah* 270π cm . *Cari jejari bagi gegelung yang paling kecil pada tudung kipas angina tersebut .*

[4 *markah*]

QUESTION 31:

CHAPTER: _____

Diagram 9 shows an archway with concrete pole which built with concrete blocks. The volume of three consecutive blocks (in m^3) are given in diagram. Find the total volume of concrete that needed to build one of the concrete pole.

[3 *marks*]

Rajah 9 menunjukkan sebuah pintu gerbang bertiang konkrit yang dibina dengan blok-blok konkrit. Isipadu bagi tiga blok konkrit (dalam m^3) berturut-turut adalah seperti yang diberi dalam rajah. Cari jumlah isipadu konkrit yang diperlukan untuk membina sebatang tiang konkrit tersebut.

[3 markah]

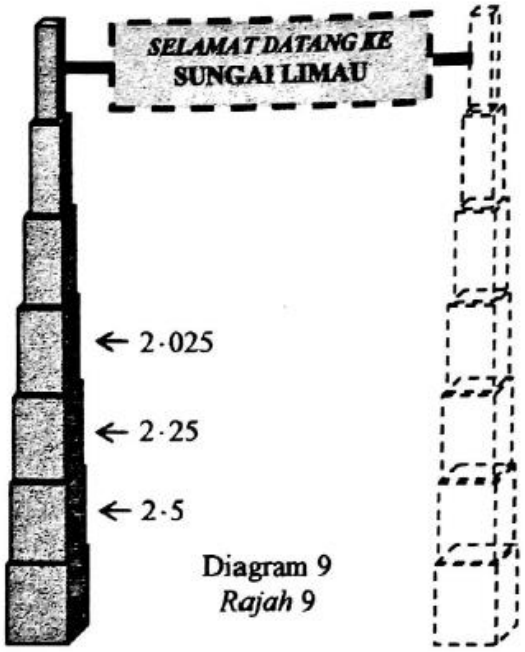


Diagram 9
Rajah 9

QUESTION 32:

CHAPTER: _____

Diagram 18 shows a cuboid metal frame used to support a cylinder tank. Find the value of x, so that the tank with the maximum volume.

Rajah 18 menunjukkan sebuah kerangka besi berbentuk kuboid yang digunakan untuk menyokong sebuah tangki berbentuk silinder. Cari nilai x yang menjadikan isipadu tangki itu maksimum.

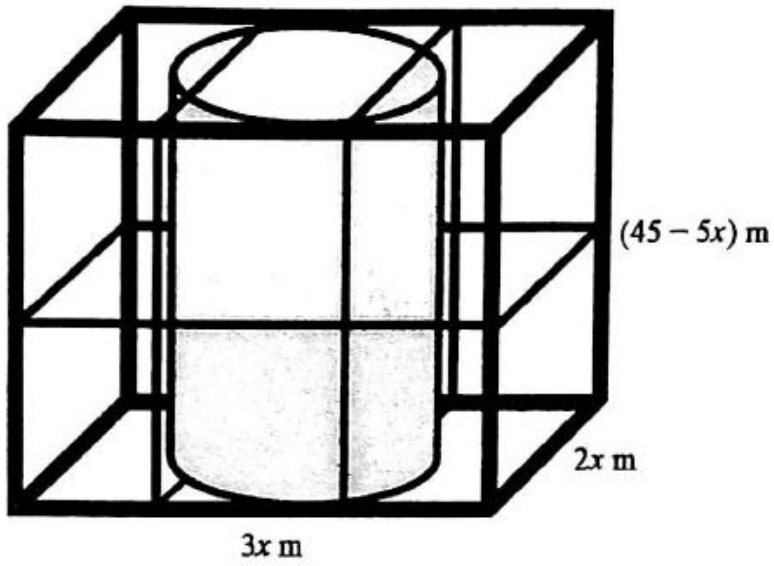


Diagram 18
Rajah 18

[4 *marks*]
[4 *markah*]

QUESTION 33:

CHAPTER: _____

$$M = \frac{4}{3-k^2}$$

The formula above is used to calculate the result obtained from an experiment. The value of k is read as 2·04 , but the actual value of k is 2. Calculate the approximate error value of M.

Formula di atas digunakan untuk mengira keputusan yang diperoleh daripada suatu eksperimen. Nilai k dibaca sebagai 2·04 tetapi nilai k yang sebenarnya ialah 2. Kirakan anggaran kesilapan bagi nilai M

[4 *marks*]
[4 *markah*]

QUESTION 34:

CHAPTER: _____

In a creative arts class, students are learned how to make hand-fan. Each students is given a piece of colour paper that has been cut .Then, the paper is folded into a few equal parts. The area of each part is $18 \cdot 4\ cm^2$. Diagram 21 shows a sample of hand-fan that have been made.

Dalam suatu kelas seni kreatif, murid-murid belajar cara untuk membuat kipas tangan. Setiap murid dibekalkan dengan sekeping kertas warna yang telah siap dipotong. Kemudian kertas itu dilipat kepada beberapa bahagian yang sama besar. Luas setiap bahagian ialah $18 \cdot 4\ cm^2$. *Rajah* 21 *menunjukkan contoh kipas tangan yang telah siap dibuat.*

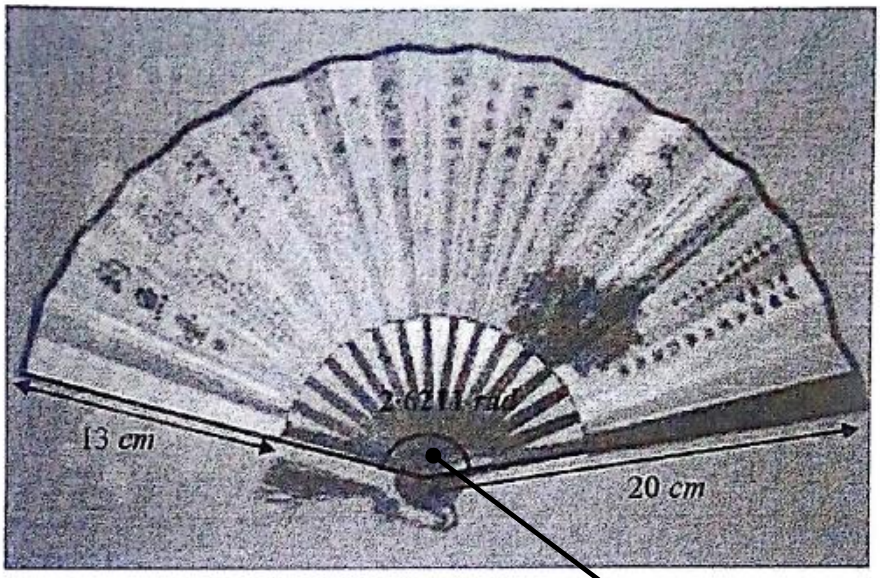


Diagram 21
Rajah 21

Find the number of folded parts.

Cari bilangan lipatan yang terhasil..

[3 *marks*]

QUESTION 35:

CHAPTER: _____

Diagram 22 shows a side elevation of an ice cream cone with height 9 unit. Given the height of cone is 6 units and outer shape of part of ice cream represented by the equation $x^2 + y^2 - 12y + 27 = 0$

Rajah 22 menunjukkan pandangan sisi ais krim kon dengan ketinggian 9 unit . *Diberi tinggi kon adalah 6 unit dan bentuk luar bagi sebahagian ais krim diwakili oleh persamaan* $x^2 + y^2 - 12y + 27 = 0$

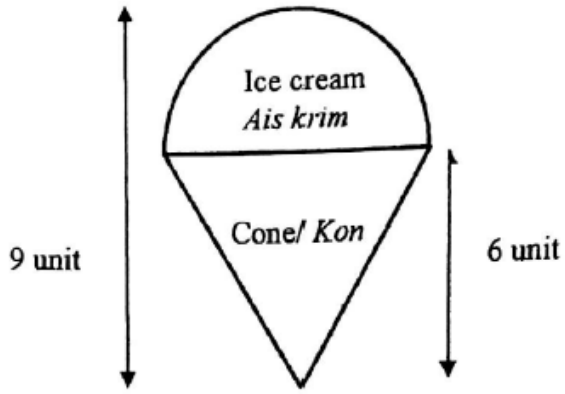


Diagram 22
Rajah 22

Find the quantity of ice cream shown (ignore contained in the cone)
Cari kuantiti ais krim yang tertera (abaikan yang terdapat didalam kon)

[4 *marks*]

QUESTION 36:

CHAPTER: _____

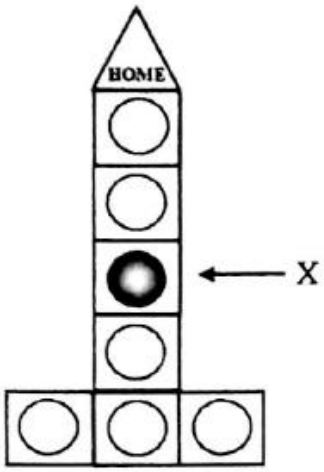


Diagram 23
Rajah 23

In the game of checkers plane, the checkers movement is depend on the number on the surface of the fair dice towards the plot 'HOME'. If the player on position X obtains the number that exceeds the number of the plots to the 'HOME' , then the player must move the checkers backward. Find the probability the player win with

(*a*) only one roll
(*b*) two rolls.

[3 *marks*]

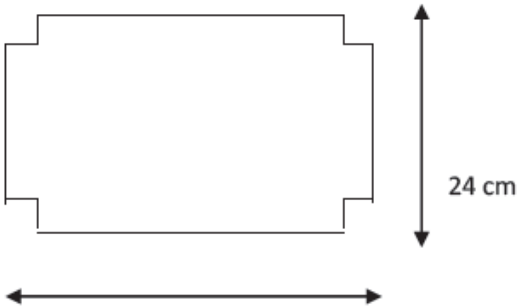
Dalam permainan dam kapal terbang, pergerakan buah dam adalah bergantung kepada bilangan nombor pada permukaan dadu yang adil menuju ke petak 'HOME'. *Jika pemain berada pada kedudukan* X *dan memperoleh nombor yang melebihi bilangan petak ke* 'HOME' *maka pemain perlu menggerakkan buah dam ke belakang. Cari kebarangkalian pemain tersebut menang dengan*

(*a*) *satu lambungan sahaja*
(*b*) *dua lambungan.*

[3 *markah*]

QUESTION 37:

CHAPTER: _____



A box is formed from a piece of cardboard as shown in the diagram. If the area of its base is 364 cm^2, find the height of the box.
Sebuah kotak dibina daripada sekeping kad seperti gambar rajah. Jika luas tapak adalah sama dengan 364 cm^2, cari ketinggian kotak itu.

[3 marks/ 3 markah]

QUESTION 38:

CHAPTER: _____

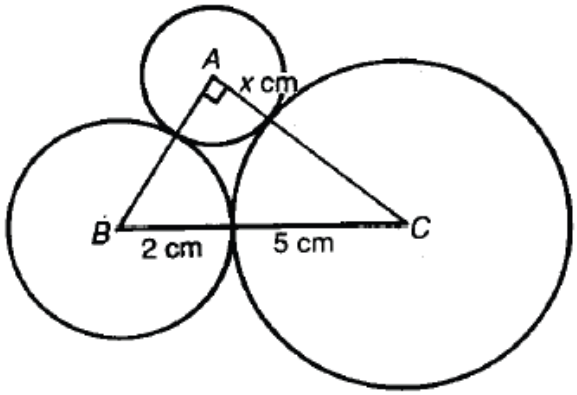


Diagram shows three circles with center A, B and C . Each circle has radius of x cm, 2 cm and 5cm respectively.Given angle BAC = 90^0, show that $x^2 + 7x - 10 = 0$. Hence , solve the equation and state the answer correct to 2 decimal place and state the radius of circle with center A.

[4 MARKS]

QUESTION 39:

CHAPTER: _____

The selling price of a used house is RM 120 000 $(\frac{8}{7})^n$ where n is the age of the house after the purchase. Find the number of years for the value of the house to be more than RM 300 000

Selepas n tahun dibeli,harga sebuah rumah ialah RM 120 000 $(\frac{8}{7})^n$ mana n adalah usia rumah setelah dibeli. Hitung tahun ke berapakah nilai rumah itu melebihi RM 300 000.

[3 marks/ 3 markah]

QUESTION 40:

CHAPTER: _____

Temperature of a type of metal increases from 30 ° C to T ° C according to equation $T = 30(1.2)^x$ when the metal is heated for x seconds. Calculate the time, in seconds, to increase the metal temperature of 30 ° C to 1500 ° C.

Suhu sejenis logam meningkat daripada 30°C kepada T°C mengikut persamaan $T = 30(1.2)^x$ apabila logam itu dipanaskan selama x saat. Hitungkan masa, dalam saat,untuk meningkatkan suhu logam itu daripada 30°C kepada 1500°C.

[3 marks/ 3 markah]

QUESTION 41:

CHAPTER: _____

1.

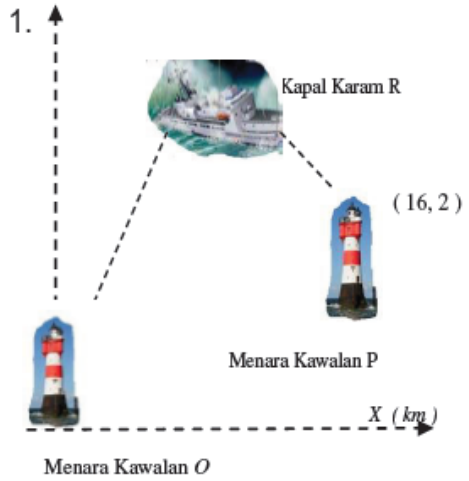


Diagram above shows the locus of a sunken ship R in the ocean which uses the coordinate system referring to the control tower O. Given that equation of straight line OR is $y = \frac{2}{3}x$ and is perpendicular with PR.

Rajah di atas, menunjukkan lokus bagi kapal karam R di lautan dengan menggunakan sistem koordinat dengan merujuk kepada menara kawalan O. Diberi bahawa garis OR mempunyai, persamaan $y = \frac{2}{3}x$ *dan berserenjang dengan PR.*

a) Find the coordinates of the sunken ship R
Cari koordinat bagi kapal karam R.

[4 marks/ 4 markah]

For safety purposes, safety buoy are placed 100m around the ship
Sebagai langkah keselamatan, sukatan terapung diletakkan pada 100 m di sekeliling kapal

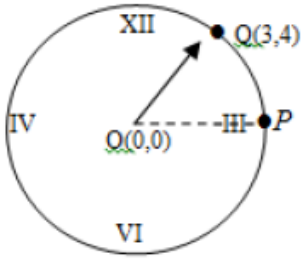
b) Find the equation of the safety buoy
Cari persamaan bagi sukatan terapung

[2 marks/ 2 markah]

QUESTION 42:

CHAPTER: _____

Diagram below shows a circular wall clock with the centre $O(0, 0)$. The pointer moves clockwise and passes through points P and Q(3 , 4) on the circumference of the clock.
Rajah di bawah menunjukkan sebuah jam dinding berbentuk bulatan dengan pusat O(0,0). Jarum penunjuk bergerak pada arah jam dan melalui titik-titik P dan Q(3,4) di atas lilitan jam itu.



(a) Find the coordinate of midpoint of PQ
Cari koordinat bagi titik tengah PQ

(b) Point $T(x,y)$ moves along the circumference of the wall clock. Find the equation of the locus of T.
Titik T(x,y) bergerak di sepanjang lilitan bulatan jam dinding itu. Cari persamaan bagi lokus T.

[3 marks/ 3 markah]

QUESTION 43:

CHAPTER: _____

Diagram below shows Salawati's transcript for semester 2 examination in Kolej Sains Amanjaya.
Rajah di bawah menunjukkan transkrip keputusan peperiksaan semester 2 bagi Salawati di kolej Sains Amanjaya.

KOLEJ SAINS AMANJAYA			
NAMA : SALAWATI BT ABU			
NOMBOR MATRIK: SM 2210235580		SEMESTER : 2/2016	
NO.	SUBJEK	MARKAH	GRED
1.	ENGLISH	70	B+
2.	MATEMATIK	75	A-
3.	FIZIK	59	C+
4.	KIMIA	62	B-
5.	BIOLOGI	68	B
(THIS SLIP IS COMPUTER GENERATED AND SIGNATURE IS NOT REQUIRED)			

Hafiz sat for the same examination and obtained an average marks of 66.8 and a standard deviation of 11.36. Both of them are the best students in the examination.
Hafiz telah mengambil peperiksaan yang sama dengan memperoleh markah purata 66.8 dan sisihan piawai 11.36.Mereka berdua merupakan pelajar terbaik bagi peperiksaan itu.

(a) Determine whose result is more consisten.
Tentukan keputusan siapa lebih konsisten.

[3 marks/ 3 markah]

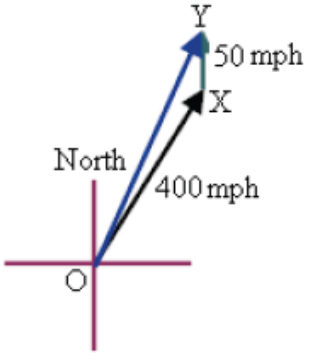
(b) An award will be given to either one of them after they sit for another subject, that is General Knowledge. After including the result of General Knowledge Examination, Hafiz's average mark become 67.5.Find the minimum marks that Salawati should obtain so that she qualifies for the award
Satu anugerah akan diberi kepada salah seorang daripada mereka selepas mereka menduduki peperiksaan bagi sat lagi subjek iaitu Pengetahuan Am. Selepas mengambil kira keputusan peperiksaan Pengetahuan Am,purata markah Hafiz menjadi 67.5.Cari markah minimum yang sepatutnya Salawati peroleh supaya dia layak mendapat anugerah itu.

[2 marks/ 2 markah]

QUESTION 44:

CHAPTER: _____

A plane travelling at 400 mph is flying with a bearing of 040°. There is a wind of 50 mph from the South. The whole situation is illustrated as the diagram below. Find
Sebuah kapal terbang sedang terbang pada kelajuan 400 mph dengan bearing 040°. Terdapat angin daripada Selatan dengan kelajuan 50 mph. Situasi ini adalah seperti yang ditunjukkan dalam rajah di bawah. Cari



a) resultant speed of the plane
laju paduan untuk kapal terbang

[Hint: Magnitude OY is the resultant speed of plane]
[Tips: Magnitud OY adalah laju paduan untuk kapal terbang]

b) final bearing of the plane
bearing akhir untuk kapal terbang

[Hint: Use the vertical component and horizontal component of vector OY to find the bearing]
[Tips: Guna komponen mengufuk dan komponen mencancang vektor OY untuk cari bearing tersebut]

[4 marks / *markah*]

QUESTION 45:

CHAPTER: _____

There are 9 points on two parallel lines. Three points are marked on one line and six points are marked on the other line. Determine the number of different triangles that can be formed by connecting the points if there is no restriction.
Terdapat 9 titik di atas dua garis lurus yang selari. Tiga titik di atas satu garis manakala enam titik di atas garis yang satu lagi. Tentukan bilangan segitiga berbeza yang dapat dibentuk dengan menghubungkan semua titik tersebut sekiranya tiada sebarang syarat dikenakan.

[3 marks/ *3 markah*]

QUESTION 46:

CHAPTER: _____

In Halim's electrical shop, there are 5 different brands of refrigerators and 8 different brands of washing machines. Halim want to exhibit the electrical appliances as shown in the diagram above. Find the number of ways that those items can be exhibited.

Di kedai elektrik Halim terdapat 5 buah peti sejuk yang berlainan jenama dan 8 buah mesin basuh yang berlainan jenama. Halim ingin mempamerkan barang-barang elektrik itu seperti yang ditunjukkan dalam rajah di atas. Hitungkan bilangan cara barang-barang itu boleh dipamerkan.

[3 marks/markah]

MODUL KBAT SPM

Depth of Knowledge

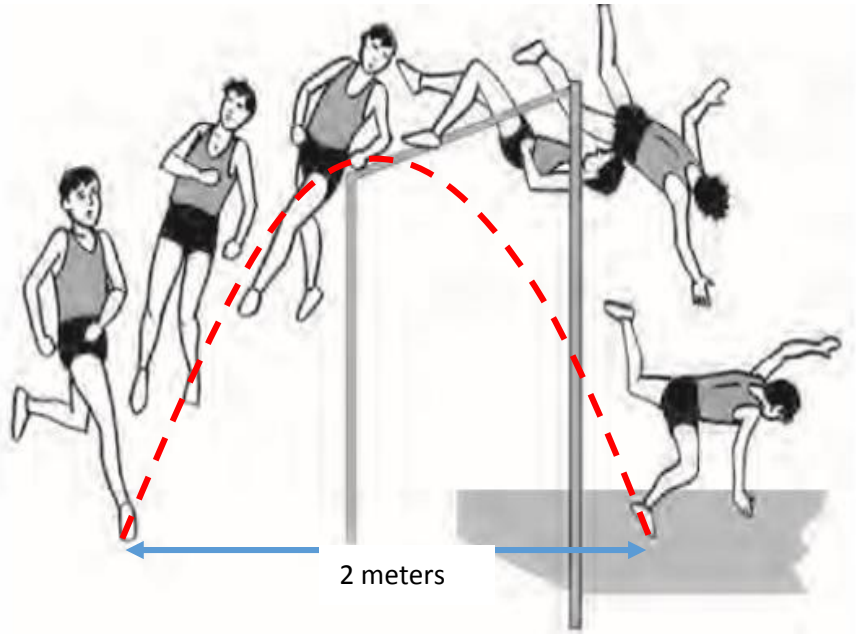
- Level 1: Recall and Reproduction
- Level 2: Basic skills and concepts
- Level 3: Strategic thinking and reasoning
- Level 4: Extended thinking

PAPER 2

QUESTION 1:

CHAPTER: _____

Ali won the high jump competition in his school. Diagram below shows Ali's high jump record. His parabolic jump is related by the equation $y = -x^2 + 2x$.



a) Find the height of Ali's jump.
b) If Ahmad can jump twice the height of Ali's. Form a new quadratic equation in the form of $y = a(x + p)^2 + q$ of Ahmad without changing the width of Ali's jump.

QUESTION 2:

CHAPTER: _____

Diagram 1 shows a birthday party cake with a diameter of 24 cm and the height of the cake is 8 cm.

Diagram 1

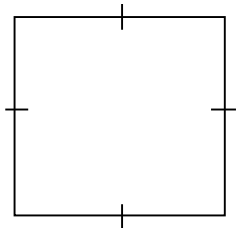
The cake is divide equally into 8 pieces and the cake is covered by cream cheese topping. Calculate the cost of topping for one slice of cake if it is given that cost of $1cm^2$ topping is RM 0.03.

[6 *marks*]

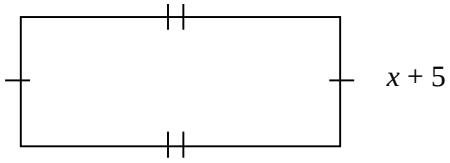
QUESTION 3:

CHAPTER: _____

Diagram 1(a) and 1(b) shows two pieces of land with same area bought by Afif.
Rajah 1(a) *dan* 1(b) *menunjukkan dua bidang tanah dengan keluasan yang sama dibeli oleh Afif.*



Diagram/Rajah 1(a)



Diagram/Rajah 1(b)

Afif want to use his savings of RM 19,000.00 to fence his lands. He needs 650 m of the wire fences to fence around his rectangular land. If the cost of building the fence is RM 15.00 per meter, calculate the cost to fence both lands. Hence, determine whether his saving is enough to cover the cost.

[7*marks*]

Afif hendak menggunakan simpanannya yang berjumlah RM19,000 *untuk memagarkan tanah-tanahnya. Dia memerlukan* 650 m *pagar kawat untuk memagarkan tanah yang berbentuk segi empat tepat. Jika kos memasang pagar ialah* RM15 *se meter, kira kos untuk memagarkan kedua-dua tanah itu. Seterusnya, tentukan sama ada simpanannya mencukupi untuk menampung kos itu.*

[7*markah*]

QUESTION 4:

CHAPTER: _____

Ahmad invested RM20 000 at 5% interest compounded annually. In t years, the investment will grow to the amount expressed by the function $P(t) = 20\,000 \cdot 1.05^t$, where t is time (in years).

Ahmad melabur sebanyak RM20 000 dengan kadar faedah kompaun tahunan sebanyak 5%. Jumlah pelaburannya bertambah dan ditunjukkan oleh fungsi $P(t) = 20\,000 \cdot 1.05^t$, *di mana t ialah masa (tahun)*

(a) How long will it take to exceed RM 50 000 in the account?
Berapa lamakah masa yang diperlukan agar jumlah pelaburannya melebihi RM50 000?

[3 marks/ 3 markah]

(b) How much would Ahmad get after 20 years of investing?
Berapakah jumlah pelaburan Ahmad selepas 20 tahun melabur?

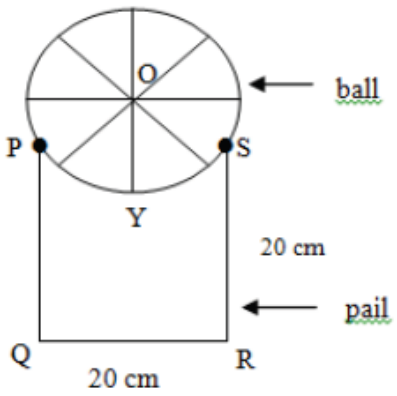
[2 marks/ 2 markah]

(c) If the interest rate decreased to 3%, how long will take to exceed RM 50 000 in the account?
Sekiranya kadar faedah berkurangan menjadi 3%, berapa lama masa diperlukan untuk jumlah pelaburannya melebihi RM50 000?

[3 marks/ 3 markah]

QUESTION 5:

CHAPTER: _____



The above figure shows the circular cross-section with centre O, of a ball that is placed on a pail with a cross-section $PQRS$. The points P and S lie on the circumference of the circular cross-section and Y is the lowest point vertically below O. If the radius of the ball 15 cm, find

Gambarajah di atas menunjukkan keratan rentas untuk suatu bola dengan pusat O yang diletakkan di atas baldi dengan keratan rentas PQRS. Titik-titik P dan S terletak pada lilitan keratan rentas membulat dan Y adalah titik yang menegak di bawah O. Jika jejeri bola tersebut adalah 15cm, cari

(a) $\angle POS$ in radians
$\angle POS$ *dalam radian.*

[2 marks/ 2 markah]

(b) the vertical height of point Y from the base of the pail
jarak menegak titik Y dari dasar baldi

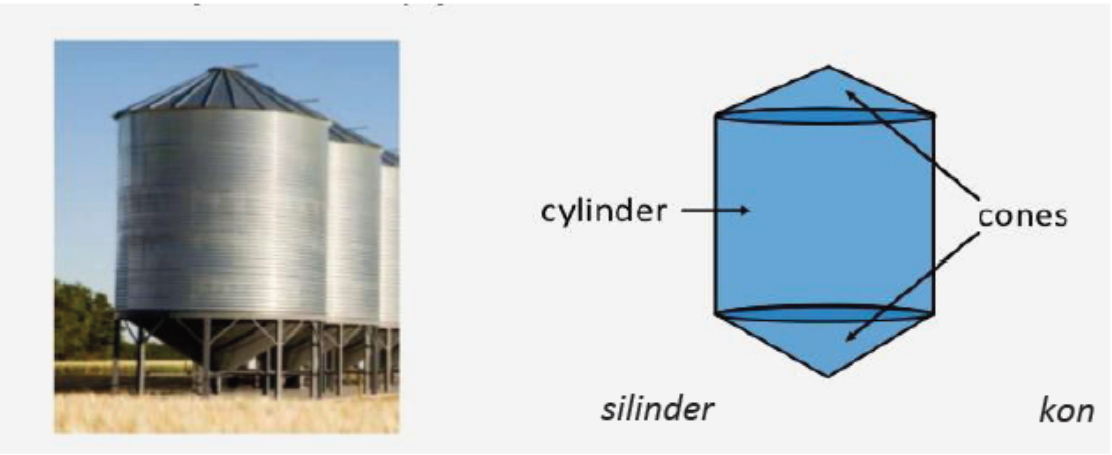
[3 marks/ 3 markah]

(c) the cross-sectional area of the section $PYSRQ$
luas keratan rentas PYSRQ

[3 marks/ 3 markah]

QUESTION 6:

CHAPTER: _____



The above diagram shows the hopper tank which consists of two cones is attached one to each end of a cylinder with radius x m. Given that the length of the slant height of the cone is 2x m and the volume of the cylinder is 32π m^3.
Rajah di atas menunjukkan tangki corong yang terdiri daripada dua buah kon terletak di dua hujung sebuah silinder yang berjejari x m. Diberi panjang sendeng kon itu ialah 2x m dan isipadu silinder ialah 32π m^3.

a) Show that the total surface area of the tank L m^2, is given that $L = 4\pi\left(x^2 + \frac{16}{x}\right)$.
Buktikan bahawa jumlah luas permukaan tangki itu, L m^2, diberi oleh persamaan $L = 4\pi\left(x^2 + \frac{16}{x}\right)$.

[2 marks/ 2 markah]

b) Calculate the value of the radius of the tank if the total surface area of the tank is minimum.
Hitungkan nilai bagi jejari bagi tangki itu jika luas permukaan tangki itu minimum.

[3 marks/ 3 markah]

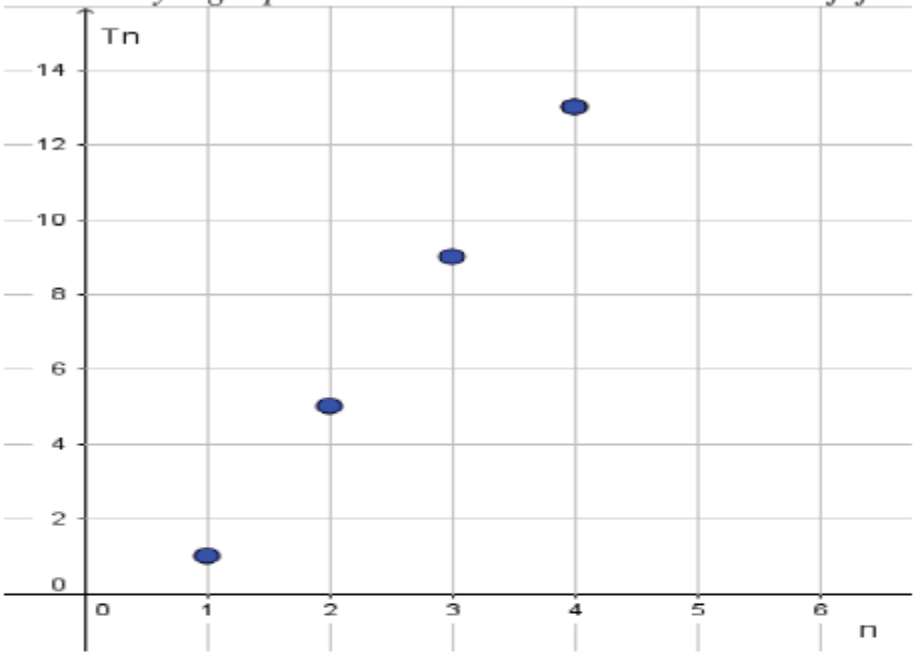
c) Given that the total surface area is increasing at rate 38 m^2 s^{-1}. Find the rate of change of the radius when its radius is 3 m.
Diberi luas permukaan tangki itu berubah dengan kadar 38 m^2 s^{-1}. Carikan kadar perubahan jejari ketika jejarinya 3 m.

[3 marks/ 3 markah]

QUESTION 7:

CHAPTER: _____

The plotted points represent terms in an arithmetic sequence:
Titik-titik yang diplotkan mewakili sebutan dalam satu jujukan aritmetik:



a) Complete the table of values below.
Lengkapkan jadual yang berikut.

n	1	2	3	4
T_n				

b) Identify d, the common diference between consecutive terms.
Kenal pasti d, beza sepunya antara sebutan yang berturut-turut.

c) Write a simplified expression for the general *nth* term of the sequence.
Tulis satu ungkapan yang dipermudahkan bagi sebutan ke-n jujukan tersebut.

d) Find the 14*th* term of the sequence.
Cari sebutan ke-14 bagi jujukan tersebut.

QUESTION 8:

CHAPTER: _____

A telecommunication company offers a package of cell phone call with a fixed fee of RM 26 per month. Phone call rates per minute is 13 cents.
Sebuah syarikat telekomunikasi menawarkan satu pakej panggilan telefon bimbit dengan yuran tetap RM 26 sebulan. Kadar panggilan telefon seminit ialah 13 sen.

a)
Construct an equation between the charges W, with the number of minutes of calls made, n, in a month.
Bentukkan satu persamaan di antara caj yang dikenakan W, dengan bilangan minit panggilan yang dibuat, n, pada setiap bulan.

b) Find /*Cari*

i) The monthly charges are imposed if a customer makes a phone call 45 minutes in a given month.
Jumlah caj sebulan yang dikenakan jika seorang pelanggan membuat 45 minit panggilan telefon pada suatu bulan tertentu.

ii) The number of minutes of calls made if a customer is charged RM 78 a month.
Bilangan minit panggilan yang dibuat jika seorang pelanggan yang lain dikenakan caj RM 78 sebulan.

QUESTION 9:

CHAPTER: _____

Antibiotic is often taken to kill bacteria. A patient takes a dose of a particular antibiotic every 3 hours. Table shows the population of bacteria, N, for intervals of 3 hours after the patient is treated with the antibiotic.
Antibiotik lazimnya diambil untuk membunuh bakteria. Seorang pesakit mengambil satu dos suatu antibiotik setiap 3 jam. Jadual menunjukkan populasi bakteria,N, untuk selang 3 jam selepas pesakit itu diubati dengan antibiotik tersebut.

Time/ *Masa*, t (h)	Population/*Pupulasi* , N
3	1 372
6	941
9	646
12	443
15	304
18	208
21	143
24	98
27	67
30	46

a) Plot $\log_{10}N$ against t.
Plot $\log_{10}N$ melawan t.
Hence/ *Dengan sedemikian*,

b) Find/ *cari*

(i) the initial bacterial population,
populasi awal bakteria,

(ii) the range of values of t when the bacterial population is less than 80,
julat nilai t apabila populasi bakteria adalah kurang daripada 80,

(iii) the percentage decrease in the bacterial population from $t = 4.5$ to $t = 16.5$.
peratusan pengurangan dalam populasi bakteria daripada $t = 4.5$ hingga $t = 16.5$.

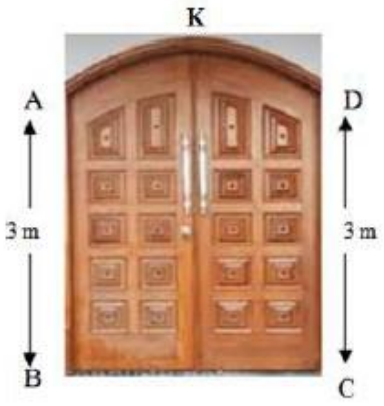
c) Express N in terms of t.
Ungkapkan N dalam sebutan t.

QUESTION 10:

CHAPTER: _____

Diagram below shows the front surface of a door. AB and DC are vertical straight lines and BC is a horizontal straight line. AKD is a symmetrical curve which is part of graph $y = 4 - \frac{x^2}{4}$. Given that AB = DC = 3m and K is the highest point from base BC.

Rajah di bawah menunjukkan permukaan depan sebuah pintu. AB dan DC ialah garis mencancang dan BC ialah garis mengufuk. AKD ialah suatu lengkung bersimetri dan merupakan sebahagian daripada graf $y = 4 - \frac{x^2}{4}$. *Diberi AB = DC = 3m dan K ialah titik tertinggi dari aras BC.*



a) Calculate the length of BC
Hitung lebar BC

b) Calculate the surface area of the front door
Hitung luas permukaan depan pintu tersebut

c) If the height of AB and DC is increased to 4m, while the width BC and the curve AKD remain unchanged, find the surface area of the new front door.
Jika tinggi AB dan DC ditambah menjadi 4m, manakala lebar BC dan bentuk lengkung AKD tidak berubah, cari luas permukaan depan pintu yang baru itu.

QUESTION 11:

CHAPTER: _____

(a) The masses of "Harum Manis" mangoes produced from Pak Dolah's orchard are normally distributed with a mean of 420 grams and a variance of 2500 grams.
Jisim mangga "Harum Manis" yang dikeluarkan dari kebun Pak Dolah adalah bertaburan secara normal dengan min 420 gram dan varians 2500 gram.

Calculate
Hitung

(i) the probability that a mango chosen randomly from Pak Dolah's orchard has a mass not more than 400 grams.
kebarangkalian bahawa sebiji manga yang dipilih secara rawak dari kebun Pak Dolah mempunyai jisim tidak melebihi 400 gram.

(ii) the value of w if 70% of the mangoes from the orchard have a mass of more than w grams.
nilai w jika 70% mangga dari kebun itu mempunyai jisim melebihi w gram.

[5 marks/ 5 *markah*]

(b) Based on the advertisement ~~above~~ **below**, answer the following questions:
Berdasarkan iklan di atas, jawab soalan berikut:

(i) Lina guesses the answers for all questions. Find the probability that she will get minimum mark to win the prize.
Lina meneka jawapan bagi kesemua soalan. Cari kebarangkalian bahawa dia mendapat markah minimum untuk memenangi hadiah.

(ii) If Zaki answered correctly 15 questions and guess the answers for the rest of the question, find the probability that he will get 60% marks.
Jika Zaki menjawab 15 soalan dengan betul dan dia meneka jawapan bagi soalan-soalan lain, cari kebarangkalian Zaki akan mendapat 60% markah.

[5 marks/ 5 *markah*]

ONLINE HISTORY QUIZ CONJUNCTION

INDEPENDENCE MONTH YEAR 2015

PERTANDINGAN KUIZ SEJARAH SECARA ATAS TALIAN SEMPENA SAMBUTAN BULAN KEMERDEKAAN TAHUN 2015

MALAYSIA

organised by/ *anjuran*

SMK Amanjaya History Club

Kelab Sejarah SMK Amanjaya

frog vle

Competition rules

Syarat-syarat pertandingan:

1. Open to all Form 1 students of SMK Amanjaya (please login your VLE Frog)
   Terbuka kepada semua pelajar Tingkatan 1 SMK Amanjaya (sila login Frog VLE masing-masing)

2. Every participant must answer all 40 multiple choice questions. Each question has 4 answers, but only 1 answer is correct.
   Setiap peserta wajib menjawab kesemua 40 soalan aneka pilihan.Setiap soalan mempunyai 4 pilihan jawapan, tetapi hanya 1 pilihan merupakan jawapan yang betul.

3. Prizes will be given to all participants who are able to score at least 18 correct answers.
   Hadiah menarik akan diberi kepada semua peserta yang menjawab sekurang-kurangnya 18 soalan dengan betul.

4. Closing date is on 10th September 2015.
   Tarikh tutup penyertaan adalah pada 10 September 2015.

COME JOIN THE QUIZ!

JOM SERTAI KUIZ INI!

QUESTION 12:

CHAPTER: _____

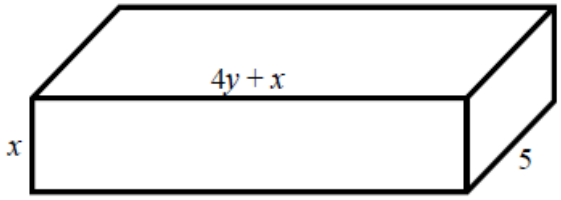


Diagram 1(*a*) / *Rajah* 1(*a*)

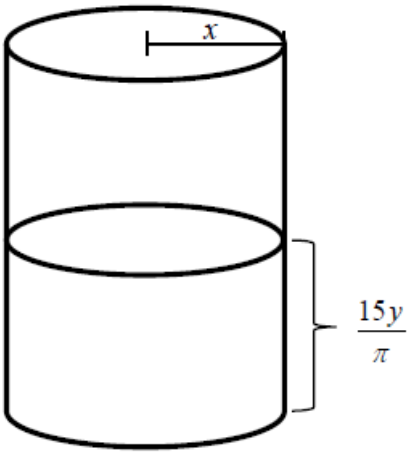


Diagram 1(*b*) / *Rajah* 1(*b*)

Company *XYZ* wants to produce a kind of chocolate bar with a mold in cuboid shape as shown in Diagram 1(*a*). Ingredient of the chocolate was provided in a cylindrical container as shown in Diagram 1(*b*). The height of the ingredient is $\frac{15y}{\pi}$.

Given the perimeter of the mold is 52 cm. Find the base area for the mold.

[Given x and y are postive integer.] [8 marks]

Sebuah syarikat XYZ ingin menghasilkan suatu jenis coklat bar dengan menggunakan acuan berbentuk kuboid seperti dalam Rajah 1(*a*). *Ramuan coklat telah disediakan dalam bekas berbentuk silinder seperti dalam Rajah* 1(*b*). *Ketinggian ramuan tersebut ialah* $\frac{15y}{\pi}$.

Diberi perimeter bagi acuan coklat bar ialah 52 cm. *Carikan luas tapak bagi acuan coklat bar.*

[*Diberi x dan y adalah integer positif.*]

[8 *markah*]

QUESTION 13:

CHAPTER: _____

(*a*) Prove that $\sin x \cot^2 x + \sin x = \operatorname{cosec} x$ [2 marks]

Buktikan $\sin x \operatorname{kot}^2 x + \sin x = \operatorname{kosek} x$ [2 *markah*]

(*b*) Diagram 7 shows a graph of trigonometric function, $y = f(x)$ for $0 \le x \le 2\pi$.

Rajah 7 menunjukkan sebuah graf bagi fungsi trigonometri, $y = f(x)$ *untuk* $0 \le x \le 2\pi$.

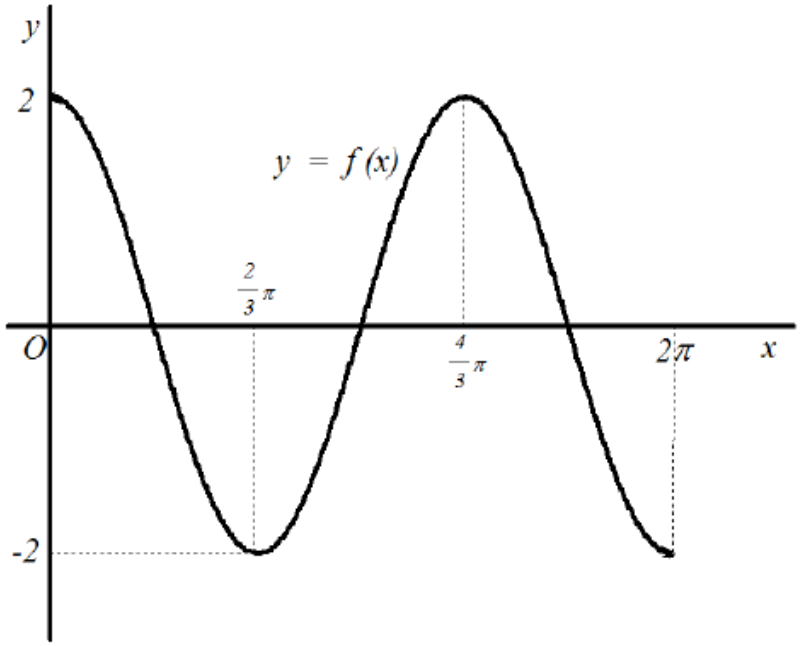


Diagram 7 / *Rajah* 7

(i) Write the equation of the graph of trigonometric function $y = f(x)$. [3 marks]

(ii) Sketch the graph of $y = 1 - f(x)$ for $0 \le x \le 2\pi$. [2 marks]

(iii) Hence, using the graph in (*b*)(ii), sketch a suitable straight line to find the number of solutions to the equation $\frac{5}{2} - f(x) - \frac{x}{\pi} = 0$ for $0 \le x \le 2\pi$.

State the number of solutions. [3 marks]

QUESTION 14:

CHAPTER: _____

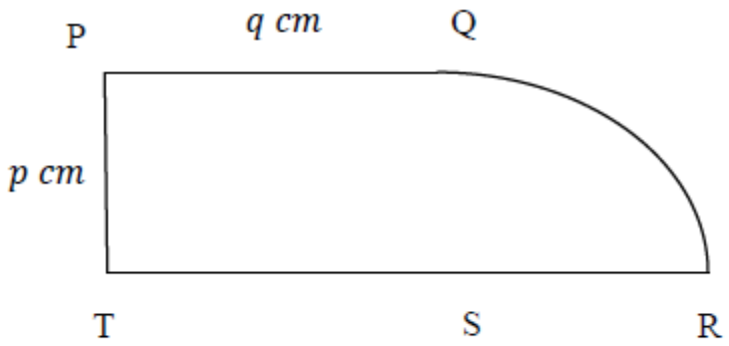


Diagram 4
Rajah 4

[Use/Guna $\pi = 3.142$]
Diagram 4 shows an exhibition base in the form of a rectangle *PQST* and a quarter circle *QRS*. Given that the area of the exhibition base is $60\pi\ cm^2$ and the length of *ST* is longer than the length of arc *RQ* by $2\pi\ cm$.
Find the value of p. Give your answer correct to two decimal places.

[6 *marks*]

Rajah 4 *menunjukkan sebuah tapak pameran yang berbentuk segi empat tepat PQST dan sukuan bulatan QRS. Diberi bahawa luas tapak pameran tersebut ialah* $60\pi\ cm^2$ *dan panjang ST melebihi panjang lengkok RQ sebanyak* $2\pi\ cm$.
Cari nilai p. *Nyatakan jawapan anda betul kepada dua tempat perpuluhan.*

[6 *markah*]

QUESTION 15:

CHAPTER: _____

Solution by scale drawing is not accepted.
Penyelesaian secara lukisan berskala tidak diterima.

Diagram 11 shows the location of a wrecked ship *R* at the ocean using coordinate system with respect to a control tower *O*.
Rajah 11 menunjukkan lokasi bagi sebuah kapal karam R di lautan dengan menggunakan sistem koordinat dengan merujuk kepada menara kawalan O.

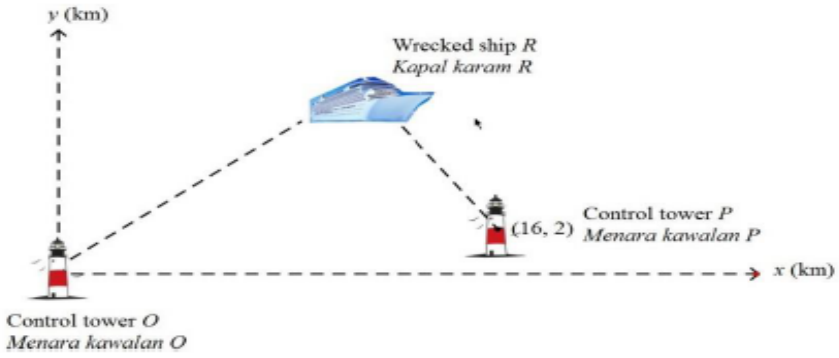


Diagram 11
Rajah 11

Given that the equation of straight line *OR* is $y = \frac{2}{3}x$ and is perpendicular to straight line *PR*.
Diberi bahawa persamaan garis lurus OR ialah $y = \frac{2}{3}x$ *dan berserenjang dengan garis lurus PR.*

Find
Cari

(a) the equation of the straight line *PR*. [3 *marks*]
persamaan garis lurus PR. [3 *markah*]

(b) the coordinates of the wrecked ship *R*. [3 *marks*]
koordinat bagi kapal karam R. [3 *markah*]

(c) the area in unit^2 , of the triangle bounded by the control tower *O*, the wrecked ship *R* and the control tower *P*. [2 *marks*]
luas, dalam unit^2, segi tiga dibatasi oleh menara kawalan O, kapal karam R dan menara kawalan P [2 *markah*]

(d) As a safety precaution, floating barriers are set 150 units around the wrecked ship *R*. Find the equation of the floating barriers. [2 *marks*]
Sebagai langkah keselamatan, sekatan terapung diletakkan pada 150 unit di sekeliling kapal karam R. Cari persamaan bagi sekatan terapung. [2 *markah*]

QUESTION 16:

CHAPTER: _____

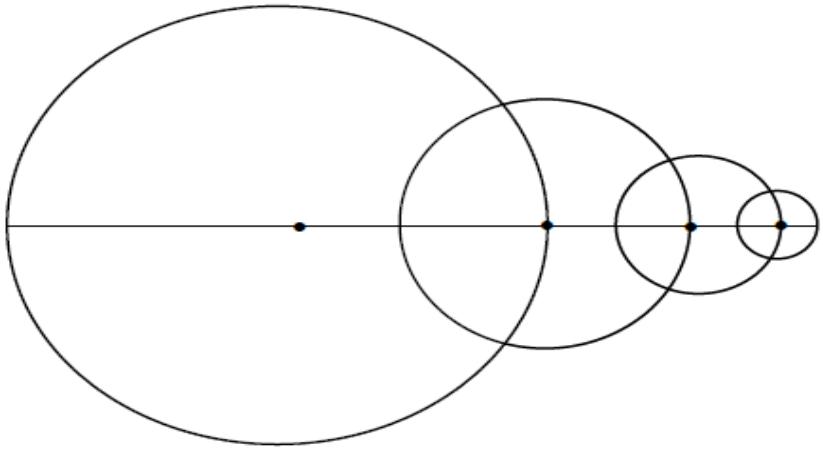


Diagram 2/ *Rajah 2*

Diagram 3 shows four circles with difference size. The largest circle has a radius of k cm. The radius of each circle are half of the radius of its previous one. The areas of the circle form a geometric progression. The terms of the progression are in descending order

Rajah 3 menunjukkan empat buah bulatan yang berlainan saiz. Bulatan yang terbesar mempunyai jejari k cm. Panjang jejari bagi setiap bulatan yang berturutan adalah separuh daripada jejari bulatan sebelumnya. Luas bulatan membentuk janjang geometri. Sebutan janjang ini adalah dalam turutan menurun.

(a) State the common ratio, hence find the area of the first circle in π if given the sum of the four circle is $132\frac{13}{16}\pi$ cm^2.

Nyatakan nisbah sepunya seterusnya cari luas bulatan yang pertama dalam π jika diberi hasil tambah luas empat bulatan ialah $132\frac{13}{16}\pi$ *cm*^{2} .

[4 marks */markah*]

(b) Determine which circle has an area of $\frac{25}{4}\pi$ cm^2.

Tentukan bulatan yang ke berapa mempunyai luas sebanyak $\frac{25}{4}\pi$ *cm*^{2}.

[2 marks */markah*]

(c) Find the sum to infinity of the areas, in cm^2, of the circles.

Cari hasil tambah hingga ketakterhinggaan dalam cm^2 *bagi bulatan itu.*

[2 marks */markah*]

QUESTION 17:

CHAPTER: _____

Diagram 4 shows a side elevation of the inner surface of a glass filled by water.
Rajah 4 menunjukkan pandangan sisi permukaan dalam bagi sebuah gelas yang diisi dengan air.

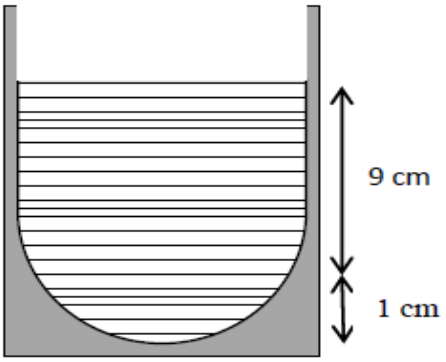


Diagram 4/*Rajah 4*

The inner diameter of the glass is 8 cm and the bottom curve surface in the glass with a depth of 1 cm can be represented by the question $y = kx^2$ where k is a constant.
Diameter dalam gelas itu ialah 8 cm dan permukaan lengkung di bawah gelas itu dengan kedalaman 1 cm boleh diwakili oleh persamaan $y=kx^2$ dimana k ialah pemalar.

(a) Show that $k = \frac{1}{16}$

Tunjukkan bahawa $k = \frac{1}{16}$

[2 marks/*2 markah*]

(b) Determine the area, in cm^2 of the side elevation of the inner surface of the glass represented by the shaded region.

Cari luas permukaan, dalam cm^2 pandangan sisi permukaan dalam gelas itu seperti yang diwakili oleh rantau yang berlorek.

[5 marks/*5 markah*]

QUESTION 18:

CHAPTER: _____

Diagram 2 shows the scales of temperature in degree Celsius (°C) and degree Fahrenheit (°F) on a thermometer. The relationship between temperature in x °C and y °F is given by function $y = 1.8x + k$, where k is a constant.

Rajah 2 menunjukkan skala bagi suhu dalam darjah Celsius (°C) *dan darjah Fahrenheit* (°F) *pada suatu termometer. Hubungan antara suhu dalam* x °C *dan* y °F *diberi oleh* $y = 1.8x + k$, *dengan keadaan* k *ialah pemalar.*

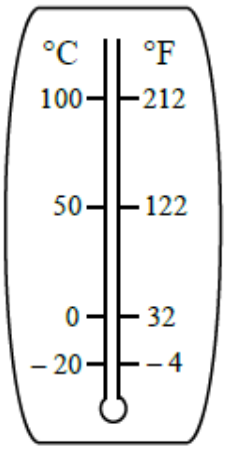


Diagram 2 / *Rajah 2*

(*a*) Find the temperature in °F if today's temperature is 32°C, [3 *marks*]

Cari suhu dalam °F *jika suhu hari ini ialah* 32°C, [3 *markah*]

(*b*) Form a function that enable us to change the temperature from degree Fahrenheit (°F) units to degree Celsius (°C) units. [2 *marks*]

Bentukkan satu fungsi yang membolehkan kita menukar suhu dari unit darjah Fahrenheit (°F) *kepada unit darjah Celsius* (°C). [2 *markah*]

QUESTION 19:

CHAPTER: _____

A group of Cikgu Asman's students conducted an experiment using a rubber ball. Diagram 4 shows the experiment in which a rubber ball dropped on a hard surface takes a sequence of vertical bounces. Each bounce is $\frac{3}{5}$ as high as the preceding one.

Sekumpulan pelajar Cikgu Asman telah menjalankan satu eksperimen menggunakan sebiji bola getah. Rajah 4 *menunjukkan eksperimen di mana sebiji bola getah dijatuhkan ke atas satu permukaan keras melantun mengikut turutan menegak. Setiap lantunan adalah setinggi* $\frac{3}{5}$ *kali berbanding lantunan sebelumnya.*

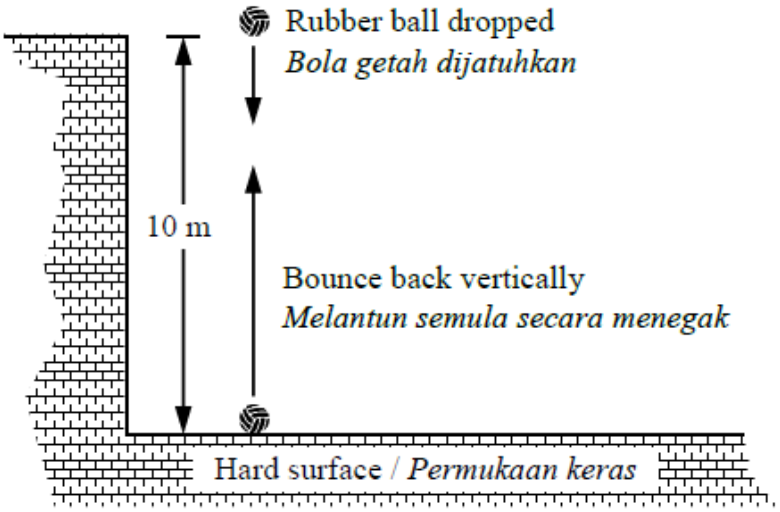


Diagram 4 / *Rajah* 4

If the ball is dropped from a height of 10 m, find

Jika bola itu dijatuhkan dari ketinggian 10 m, *cari*

(*a*) the height of the ball on the fifth bounce, [3 *marks*]

tinggi bola itu pada lantunan ke-5, [3 *markah*]

(*b*) the total distance traveled by the ball from the start until the 5th bounce.

jumlah jarak tegak yang dilalui oleh bola itu daripada mula hingga lantunan ke-5.

[3 *marks* / *markah*]

QUESTION 20:

CHAPTER: _____

(*a*) The number of computer chips produced by a machine is given by $n = 6(5^t) + (5^{t+1}) + 2(5^{t-1})$, where t is the operation time, in hours, of the machine. Determine the time used by the machine to produce 7125 computer chips.

Bilangan cip komputer yang dihasilkan oleh sebuah mesin diberi oleh $n = 6(5^t) + (5^{t+1}) + 2(5^{t-1})$ *dengan keadaan t ialah masa operasi, dalam jam, mesin itu. Tentukan masa yang digunakan oleh mesin itu untuk menghasilkan* 7125 *keping cip komputer.*

[3 *marks* / *markah*]

(*b*) Given $x = 3^m$ and $y = 3^n$, express $\log_9 \frac{27y}{x^4}$ in terms of m and n. [5 *marks*]

Diberi $x = 3^m$ *dan* $y = 3^n$, *ungkapkan* $\log_9 \frac{27y}{x^4}$ *dalam sebutan m dan n.*

[5 *markah*]

QUESTION 21:

CHAPTER: _____

Ah Choon is releasing yoyo ball 48 cm below from his fingers. He lets the yoyo ball moves up and down vertically by itself. After the first bounce, the yoyo ball bounces $\frac{3}{4}$ from its previous length as shown in Diagram 3. The yoyo ball continues bouncing until it stops.

Ah Choon melepaskan bola yoyo 48 cm *ke bawah jarinya. Dia membiarkan bola yoyo itu bergerak ke atas dan ke bawah secara menegak dengan sendiri. Selepas lantunan pertama, bola yoyo itu melantun sebanyak* $\frac{3}{4}$ *daripada jarak sebelumnya seperti ditunjukkan dalam Rajah* 3. *Bola yoyo itu terus melantun sehingga berhenti.*

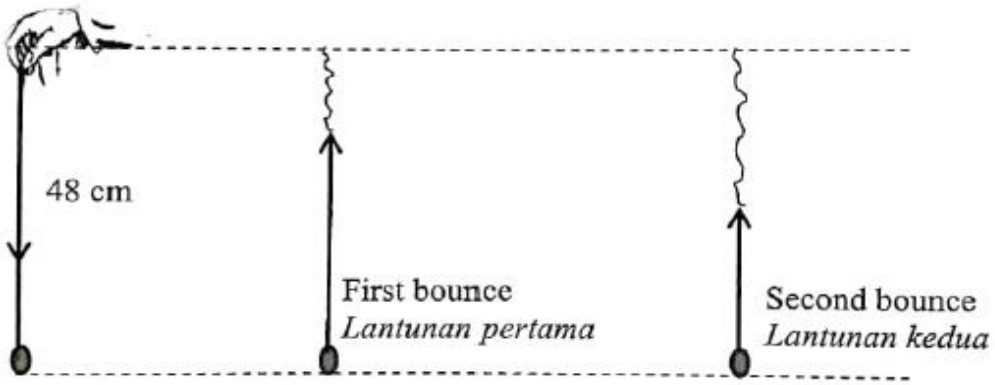


Diagram 3
Rajah 3

Find
Cari

(*a*) the number of bounces when the distance of the yoyo ball from Ah Choon fingers is 46.48cm. [4 *marks*]
bilangan lantunan apabila jarak bola yoyo itu dari jari Ah Choon ialah 46.48 cm. [4 *markah*]

(*b*) total distance , in cm , travelled by the yoyo ball from the first bounce until it stops. [3 *marks*]
jumlah jarak , dalam cm , *yang dilalui oleh bola yoyo bermula dari lantunan pertama sehingga berhenti.* [3 *markah*]

QUESTION 22:

CHAPTER: _____

Diagram 4 is a histogram that shows the number of hours of overtime job done by the workers in a factory for the first three months of the year.
Rajah 4 ialah sebuah histogram yang menunjukkan bilangan jam kerja lebih masa yang dibuat oleh pekerja sebuah kilang untuk tiga bulan pertama suatu tahun.

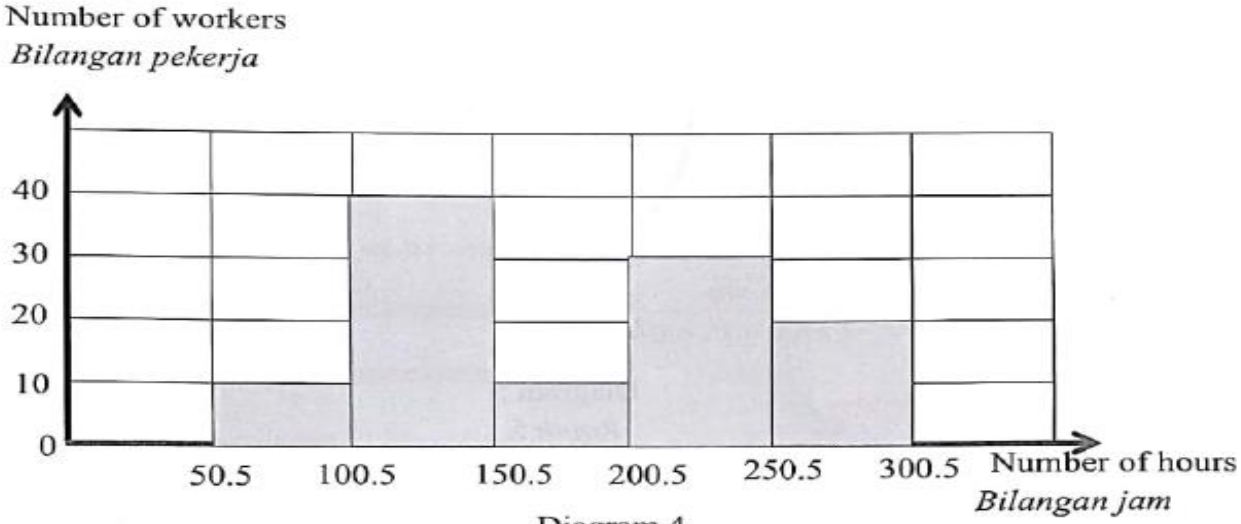


Diagram 4
Rajah 4

(*a*) Find
Cari

(i) the number of hours of overtime job done by most of the workers.
bilangan jam kerja lebih masa yang dibuat oleh kebanyakan pekerja.

(ii) the average number of hours of overtime job done by the workers.
purata jam kerja lebih masa yang dibuat oleh pekerja-pekerja tersebut.

[4 *marks*]
[4 *markah*]

(*b*) Excellent Worker Award will be given to 25% of workers who did the most overtime job. Find the minimum number of hours of overtime job, done by the worker who qualified for the award. [3 *marks*]
Anugerah Pekerja Cemerlang akan diberi kepada 25% pekerja yang melakukan paling banyak kerja lebih masa. Cari bilangan jam minimum kerja lebih masa yang dibuat oleh pekerja untuk melayakkan mereka menerima anugerah tersebut.

[3 *markah*]

QUESTION 23:

CHAPTER: _____

Diagram 5 shows cross section of a drain of a school.
Rajah 5 menunjukkan keratan rentas suatu longkang dari suatu sekolah.

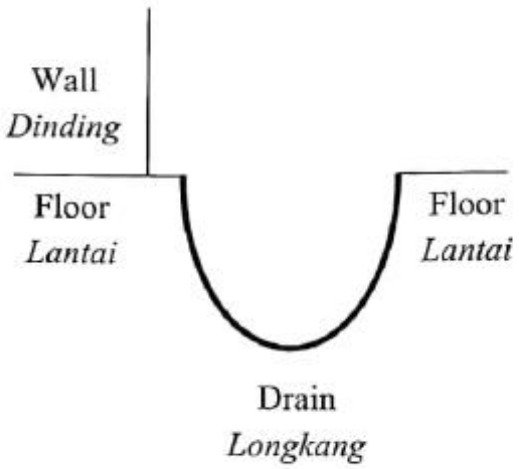


Diagram 5
Rajah 5

Given the shape of the drain can be represented by the equation $y = \frac{2}{5}x^2 - 12x + 50$.

Diberi bentuk longkang tersebut boleh diwakili oleh persamaan $y = \frac{2}{5}x^2 - 12x + 50$.

Find
Cari

(*a*) the width of the drain, [3 *marks*]
lebar bukaan longkang tersebut, [3 *markah*]

(*b*) the maximum depth of the drain. [3 *marks*]
kedalaman maksimum longkang tersebut. [3 *markah*]

QUESTION 24:

CHAPTER: _____

Diagram 2 shows part of the arrangement of 509 tiles on a wall of a room.

Rajah 2 menunjukkan sebahagian daripada susunan 509 jubin pada dinding sebuah bilik.

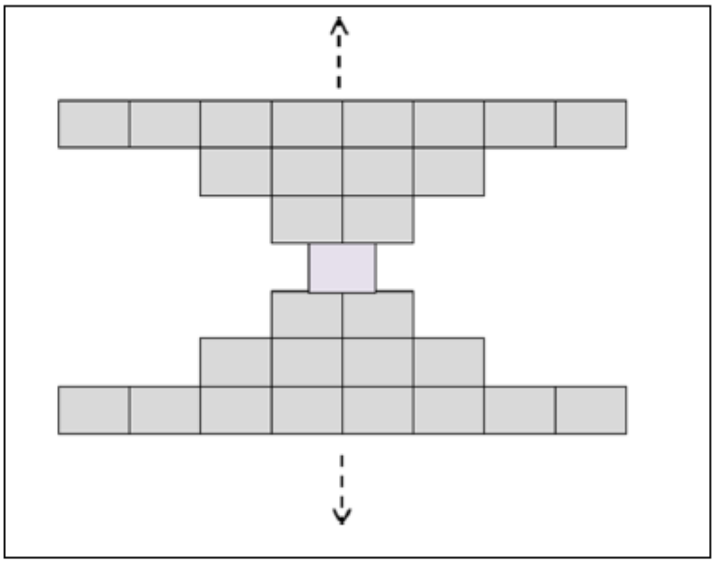


Diagram 2
Rajah 2

Find
Cari

(a) the number of rows of tiles that can be arranged, [3 *marks*]
bilangan baris jubin yang boleh disusun, [3 *markah*]

(b) the number of tiles in the bottom row. [3 marks]
bilangan jubin pada baris paling bawah. [3 *markah*]

QUESTION 25:

CHAPTER: _____

Diagram 5 shows the intersection of two paths which are perpendicular to each other in a nursery. Four water sprinklers, *O*, *A*, *B* and *C* are installed at the positions shown with respect to their shortest distances from both paths.

Rajah 5 menunjukkan persimpangan lorong yang berserenjang antara satu sama lain dalam sebuah nurseri. Empat penyembur air, O, A, B dan C dipasang pada kedudukan seperti yang ditunjukkan merujuk kepada jarak terdekat masing-masing daripada kedua-dua lorong.

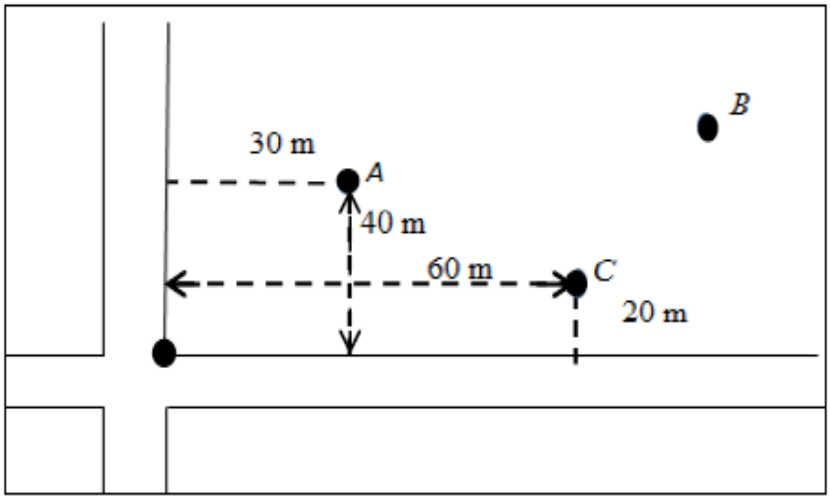


Diagram 5
Rajah 5

Given that *OABC* is a parallelogram.

Diberi OABC adalah sebuah segi empat selari.

(a) If the position of water sprinkler O is represented by $(0, 0)$, state the position of water sprinkler A and C. [1 *mark*]

Jika kedudukan penyembur air O diwakili oleh $(0, 0)$, *nyatakan kedudukan bagi penyembur air A dan C .* [1 *markah*]

(b) Find the shortest distance between water sprinkler O and water sprinkler B.

[3 *marks*]

Cari jarak terdekat di antara penyembur air O dan penyembur air B.

[3 *markah*]

(c) Another water sprinkler D is installed such that its distance from A is 2 times its distance from C. Find the position of water sprinkler D. [3 *marks*]

Satu lagi penyembur air D dipasang dengan keadaan jaraknya dari A adalah dua kali jaraknya dari C. Cari kedudukan penyembur air D. [3 *markah*]

QUESTION 26:

CHAPTER: _____

Diagram 8 shows a side elevation of an ice cream. The top surface of ice cream can be represented by the equation $y = ax^2 + 11$.

Rajah 8 menunjukkan pandangan sisi sejenis aiskrim. Permukaan atas aiskrim boleh diwakili oleh persamaan $y = ax^2 + 11$.

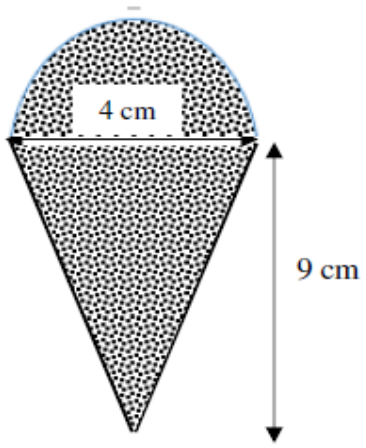


Diagram 8 / *Rajah 8*

(*a*) (i) Show that $a = -\frac{1}{2}$ [2 *marks*]

Tunjukkan bahawa $a = -\frac{1}{2}$ [2 *markah*]

(ii) Determine the volume, in unit^3, of the ice cream before it melts. [5 *marks*]

Tentukan, isipadu aiskrim kon itu, dalam unit^3 *sebelum ia mencair.* [5 *markah*]

(*b*) It is given that $y = -\frac{1}{2}x^2 + 11$. Find the small change in y, when the value of x changes from 2 to 1·99.

Diberi bahawa $y = -\frac{1}{2}x^2 + 11$. *Cari perubahan kecil dalam y, apabila nilai x berubah dari 2 kepada* 1·99.

[3 *marks*]
[3 *markah*]

QUESTION 27:

CHAPTER: _____

Red and green cards in equilateral triangle shapes in a box need to arrange as Diagram 5. The red cards are arranged in odd row while the green cards are in even row.

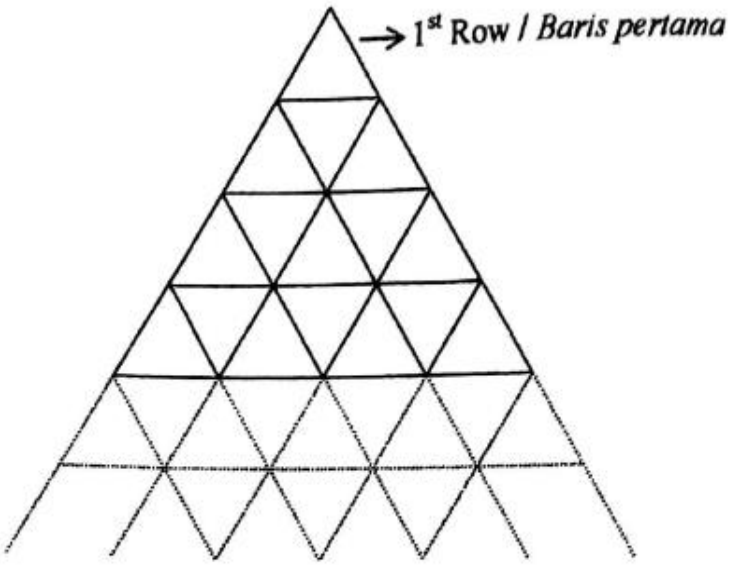


Diagram 5

Rajah 5

Find

(*a*) the number of cards use to form 15^{th} row,

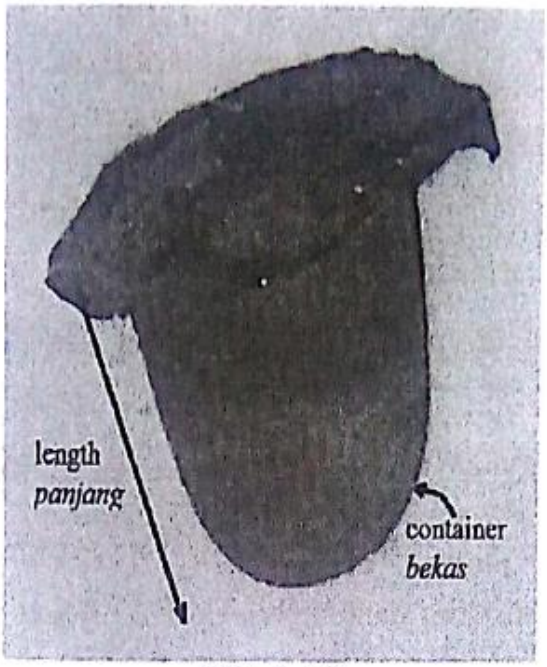
(*b*) the total number of green cards are used if there are twenty row,

(*c*) the maximum row will be formed if in the box have 800 green cards and 435 red cards.

[7 marks]

QUESTION 28:

CHAPTER: _____



Jelly / *Jeli*
Diagram 6 / *Rajah* 6

Majuli Factory wants to produce a kind of jelly as shown in Diagram 6. Known that 9π cm^3 of ingredient can produce 6 jellies. Inner side of the jelly container is parabolic in shape with equation $y=3x^2+1$.

(*a*) Sketch the parabolic shape of container with equation $y=3x^2+1$.

[3 marks]

(*b*) What is the length of a piece of jelly produced by Majuli Factory ?

[5 marks]

QUESTION 29:

CHAPTER: _____

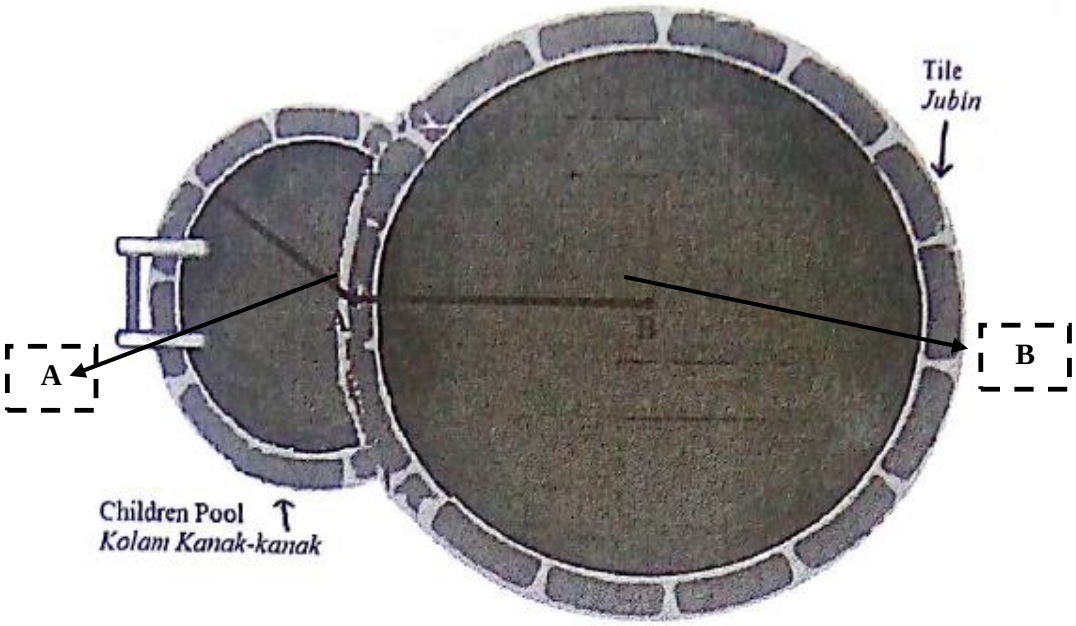


Diagram 8 / *Rajah* 8

Pemaju Aman gets a contract to build a swimming pool at Kelab Jaya. The shape of swimming pool is a small circle centered A with diameter of 4 m and a large circle centered B with diameter of 12 m as shown in Diagram 8. Surrounding the pool is installed with tiles.

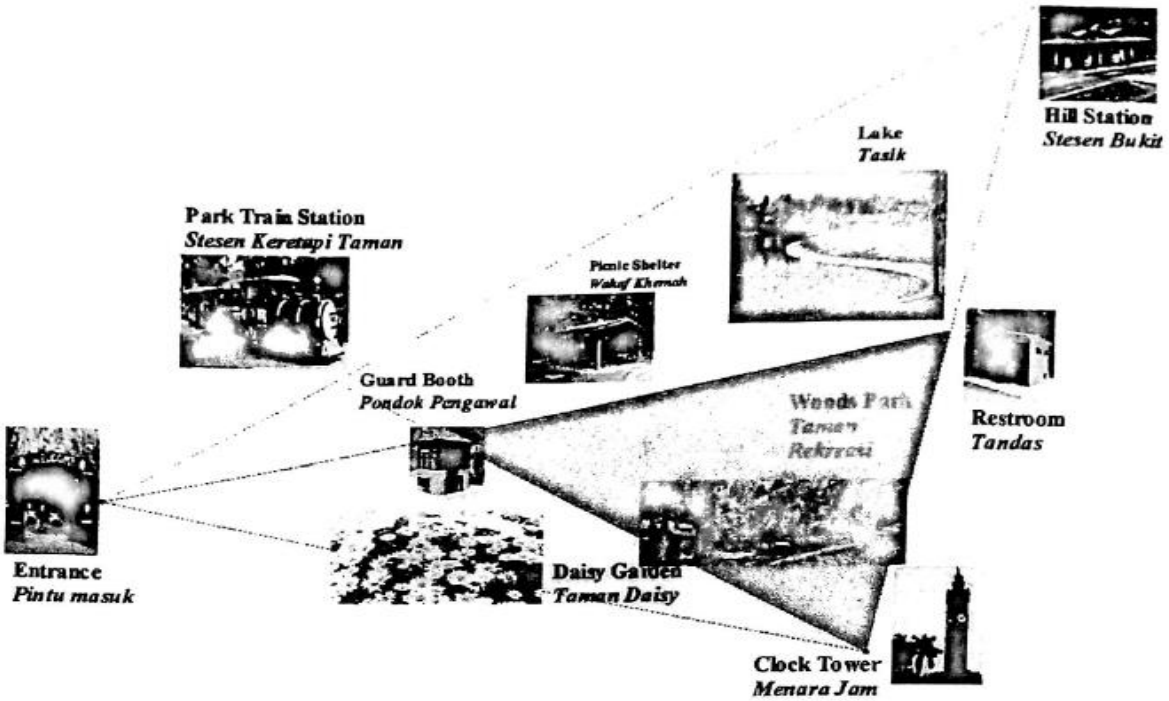
(*a*) What is the length that needs to be installed around the pool with tiles?

(*b*) The small pool is children pool. Calculate the area of children pool.

[10 marks]

QUESTION 30:

CHAPTER: _____



Kids Bestari Park

Diagram 11 / *Rajah* 11

Diagram 11 shows a map of Kids Bestari Park. Deena brings her son, Ferad to the park. The distance from entrance to Hill Station is four times distance from entrance to Park Train Station. The ratio of distance between Park Train Station to Clock Tower and Park Train Station to Guard Booth is $5 : 1$. Restroom is equal distance from Hill Station and Clock Tower. The movement from entrance to Park Train Station represent by $3\underset{\sim}{x}$ and the movement from Clock Tower to Restroom represent by $2\underset{\sim}{y}$.

(*a*) Express the movement in terms of $\underset{\sim}{x}$ and / or $\underset{\sim}{y}$ if

(i) Ferad wants to go from Park Train Station to Hill Station,

(ii) Deena move from entrance to Guard Booth.

b) The ratio of distance from entrance to Guard Booth and distance from entrance to Restroom is $2 : h$. Find the value of h.

:) Shows that $\dfrac{\text{area of Daisy Garden}}{\text{area of Woods Park}} = \dfrac{2}{3}$.

[10 marks]

QUESTION 31:

CHAPTER: _____

Encik Fuad bought a circular layer cake with the centre O as shown as Diagram 9, has a diameter 20 cm and thickness 0f 8 cm, for his son's birthday.
Encik Fuad membeli sebiji kek lapis berpusat O seperti ditunjukkan dalam Rajah 9, *mempunyai diameter* 20 cm *dan ketebalan* 8 cm, *untuk harijadi anaknya.*

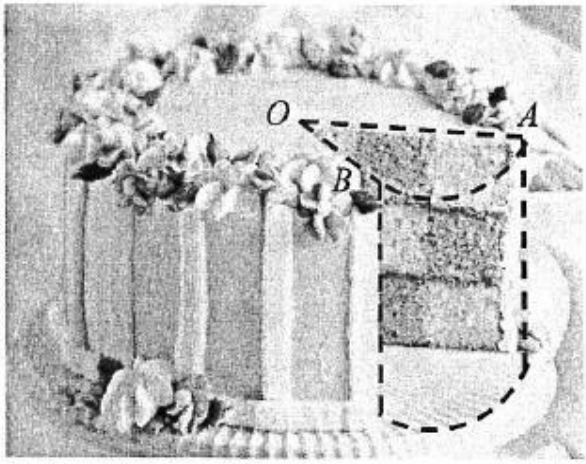


Diagram 9 / *Rajah* 9

Minor sector OAB with angle 20° is cut out and give to his mother.
Sektor minor OAB dengan sudut 20° *dipotong untuk diberikan kepada ibunya.*

(*a*) Find the perimeter, in cm, of minor sector *OAB*, [3 *marks*]
Cari perimeter, dalam cm, *bagi sektor* minor *OAB*, [3 *markah*]

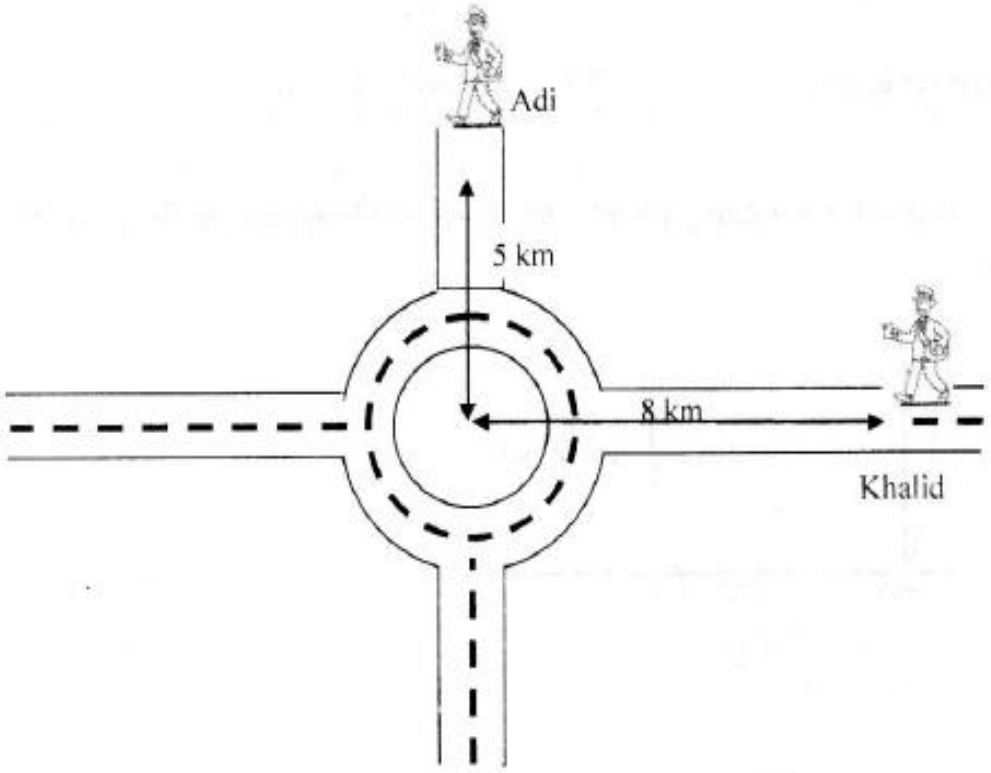
(*b*) Find the total surface area of the piece of cake given to his mother. [4 *marks*]
Cari jumlah luas permukaan bahagian kek yang diberi kepada ibunya. [4 *markah*]

(*c*) Hence, calculate the volume, in cm^3, of the remaining cake. [3 *marks*]
Seterusnya, hitung isi padu, dalam cm^3, *baki kek yang tinggal.* [3 *markah*]

QUESTION 32:

CHAPTER: _____

Semasa perjalanan balik kampung sempena Hari Raya Aidilfitri 2016. Adi terpaksa merentasi satu bulatan yang sesak dengan kenderaan. Adi berada 5 km daripada pusat bulatan dan kawan Adi, Khalid berada 8 km daripada pusat bulatan. Kedudukan mereka adalah sebagaimana dalam Rajah 3.



Rajah 3

[Andaikan pusat bulatan adalah titik asalan]

(*a*) Terdapat jalan pintas antara kedudukan Adi dan Khalid. Cari
   (i) Persamaan jalan pintas itu dalam bentuk am.
   (ii) Persamaan garis serenjang dengan jalan pintas dan melalui kedudukan Adi.

[5 *markah*]

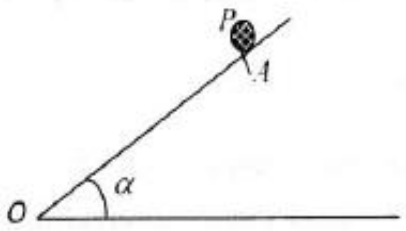
(*b*) Aza yang terperangkap dalam kesesakan itu terpaksa merentasi bulatan seperti dalam Rajah 3. Cari persamaan lokus pergerakan Aza di sepanjang bulatan tersebut jika jejari bulatan adalah 10 m.

[2 *markah*]

QUESTION 33:

CHAPTER: _____

Gunakan kertas graf untuk menjawab soalan ini.



Rajah 11

Rajah 11 menunjukkan suatu satah condong licin OA yang bersudut α dengan ufuk. Suatu zarah P dilepaskan dari keadaan rehat di titik A. Jarak zarah P, s m, diukur selepas t s ia dilepaskan. Keputusannya dicatatkan seperti berikut :-

Masa t (s)	1.0	2.0	3.0	4.0	5.0
Jarak s (m)	1.35	5.40	12.15	21.50	33.75

Diberi s adalah berkadar terus kepada t^2.

(*a*) Plot graf s melawan t^2 dengan menggunakan skala 4 cm kepada 5 unit pada paksi-t^2 dan 2 cm kepada 5 unit pada paksi-s. Seterusnya, lukiskan garis lurus penyuaian terbaik.

[4 *markah*]

(*b*) Daripada graf anda, carikan

(i) jarak yang dilalui oleh zarah P daripada $t = 1.5$ hingga $t = 2.4$,

(ii) masa yang diambil untuk zarah P sampai di O jika $OA = 30$ m.

[3 *markah*]

(*c*) Hubungan antara s dan t diberi oleh persamaan $s = 4.9t^2 \sin\alpha$.

(i) gunakan graf anda di 11(*a*) untuk menentukan nilai α dalam darjah.

(ii) pada paksi yang sama, lukiskan graf bagi zarah P yang dilepaskan daripada satah condong pada sudut 30° kepada ufuk.

[3 *markah*]

QUESTION 34:

CHAPTER: _____

Diagram 6 shows the rectangular shape of a poster.

Rajah 6 menunjukkan poster berbentuk segiempat tepat.

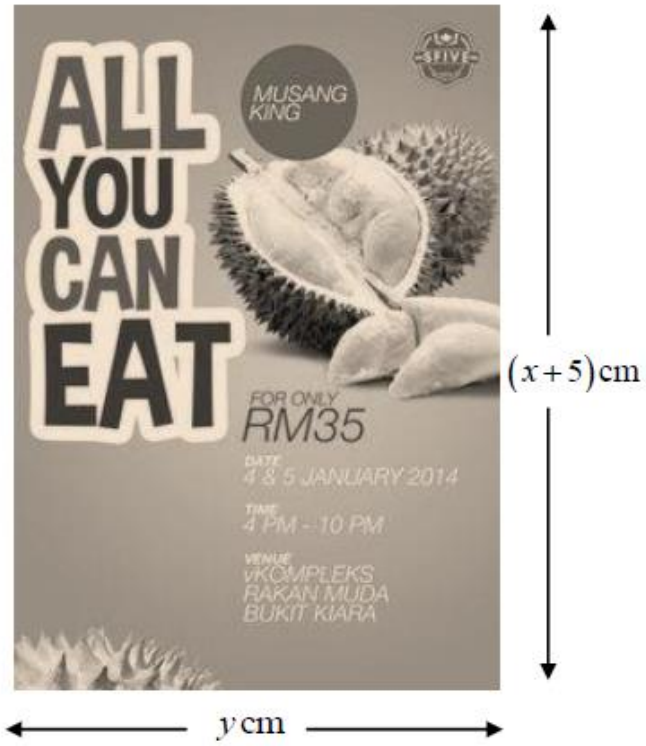


Diagram 6
Rajah 6

The perimeter of the poster is 85 cm. The area of the poster is $424\,\text{cm}^2$. Find the length and the width of the poster.

Perimeter poster ialah 85 cm. *Luas poster ialah* $424\,\text{cm}^2$. *Cari panjang dan lebar poster.*

[6 *marks*]
[6 *markah*]

QUESTION 35:

CHAPTER: _____

Diagram 11 shows a pie chart of World Population by continent in year 2015

Rajah 11 *menujukkan carta pai bagi Populasi Dunia mengikut benua pada tahun* 2015.

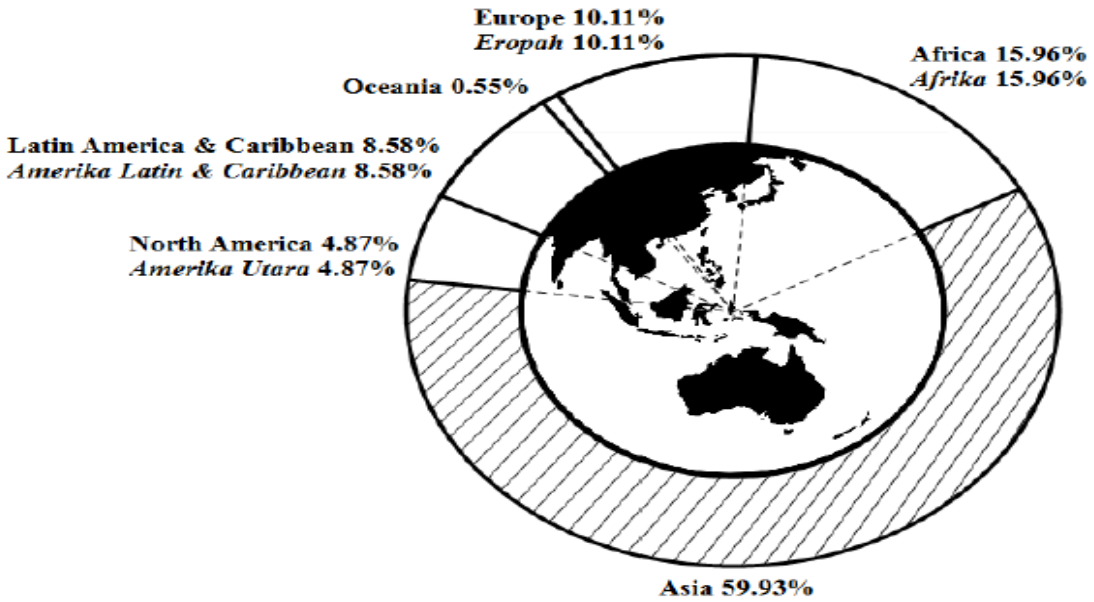


Diagram 11
Rajah 11

[Resources: http://www.statista.com/statistics/262881/global-population-by-continent/]

Given that the radius of the Earth inside the pie chart is 5 cm and the radius of the pie chart is 3 cm more than the radius of the Earth.

Diberi bahawa jejari bumi yang berada di dalam carta pai ialah 5 cm *dan jejari carta pai tersebut* 3 cm *lebih daripada jejari bumi.*

Find

Cari

(a) the angle of the pie chart that represents Asian Population, in radian,
sudut bagi carta pai yang mewakili Populasi Asia, dalam radian,

[2 *marks*]
[2 *markah*]

(b) the perimeter of the shaded region,
perimeter kawasan berlorek,

[4 *marks*]
[4 *markah*]

(c) the area of the shaded region.
luas kawasan berlorek.

[4 *marks*]
[4 *markah*]

QUESTION 36:

CHAPTER: _____

Diagram 1 shows a rectangular room. The shaded region is a rectangularcarpet which covered the room and placed 1 m from each of the walls of the room.

Rajah 1 menunjukkansebuahbilik yang berbentuk segiempattepat. Rantau berlorek itu dilitupi oleh permaidani segiempat tepat yang diletakkan 1 *m daripada dinding-dinding bilik itu.*

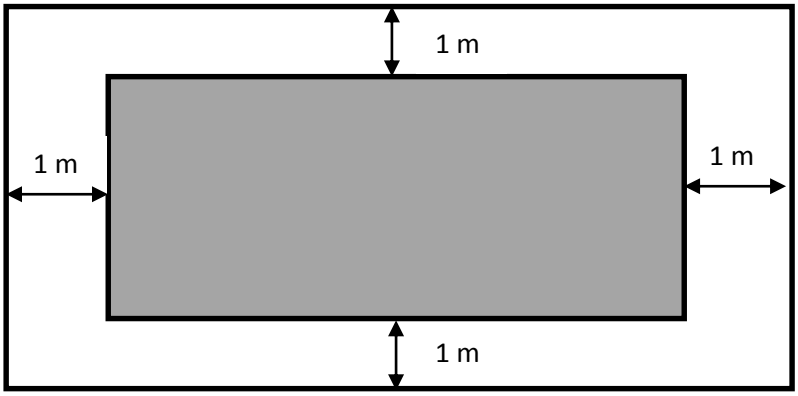


Diagram 1 / *Rajah* 1

If the area and the perimeter of the carpet are 8.75 m^2 and 12 m respectively, find the measurement of the room.
Jikaluasdan perimeter permaidani itu masing-masing ialah 8.75 m^2 *dan* 12 *m, cari ukuran bilik itu.*

[7 marks/7*markah*]

QUESTION 37:

CHAPTER: _____

Blue and yellow cards in equilateral triangle in a box need to be arrange as in Diagram 2. The blue cards are arranged in odd row while the yellow cards are in even row.
Kad-kad berbentuk segitiga sama berwarna biru dan kuning di dalam kotak ingin disusun seperti Rajah 2 di bawah. Kad-kad disusun di mana barisan ganjil berwarna biru manakala barisan genap berwarna kuning.

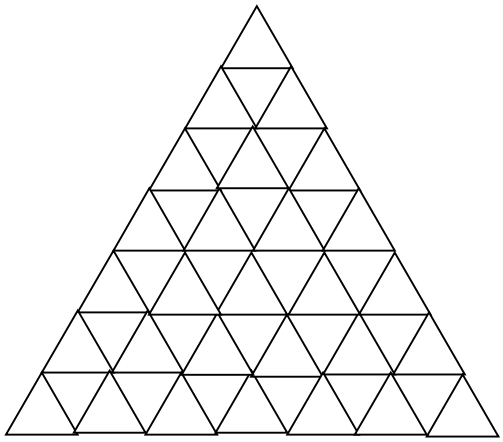


Diagram 2 /*Rajah* 2

Find
Cari

(a) the number of cards use to form 15^{th} row.
Bilangan kad yang digunakan untuk membentuk barisan yang ke -15

[2 marks/*markah*]

(b) the total number of yellow cards are used if there are twenty rows.
jumlah bilangan kad berwarna kuning yang digunakan jika susunan yang dibuat adalah sebanyak dua puluh barisan.

[2 marks/*markah*]

(c) the maximum row will be formed if in the box have 800 yellow cards and 435 blue cards.
Bilangan baris maksimum yang boleh dibentuk jika di dalam kotak dibekalkan 800 *kad kuning dan* 435 *kad biru.*

[3marks/*markah*]

MODUL KBAT SPM

Depth of Knowledge

- Level 1: Recall and Reproduction
- Level 2: Basic skills and concepts
- Level 3: Strategic thinking and reasoning
- Level 4: Extended thinking

ANSWER

Q1:

Answer	Marks
$(-1.3542\ ,0)$	4
$x=\frac{-8\pm\sqrt{8^2-4(1)(9)}}{2(1)}$	B3
$x^2+8x+y^2-6y+9=0$	B2
$(-4,3)$	B1
Alternative way:	
$(-1.3542\ ,0)$	4
$h=\frac{-8\pm\sqrt{8^2-4(1)(9)}}{2(1)}$	B3
$\sqrt{(h-(-4))^2+(0-3)^2}=4$	B2
(-4, 3)	B1

No.	Marking Scheme	Marks
Q2:	Elite 5 and Honest 4	4
	$x=14210$	B3
	$\frac{x-10000}{5000}=0.842$	B2
	$z=0.842$	B1

Q3:

Marking Scheme	MARK
$\theta = \frac{16}{15}$	4
$r = 5$	B3
$\frac{11}{9} = \frac{12+2r}{8+2r}$	B2
Hayunan ketiga = 8m	B1

4	No B3 : maximum value $= 3$ B2 : $-\frac{3}{121}(x-11)^2 + 3$ B1 : $-\frac{3}{121}\left[(x-11)^2 - 121\right]$

Q5:

88.49

B3: $\frac{1}{2}(12)^2(2.095) - \frac{1}{2}(12)^2 \sin 120°$

B2: $\frac{1}{2}(12)^2(2.095)$ or $\frac{1}{2}(12)^2 \sin 120°$

B1: $120°$ or 2.095 rad

Q6:

2.35

B2 : $-(x-2)^2 + 1$

B1 : $-\left[(x-2)^2 - 4\right] - 3$

Q7:

$Q(-3,5)$

B2 : $\frac{1}{3}x+6=-3x-4$

B1 : Equation PQ , $y=\frac{1}{3}x+6$

Q8:

14.67//14.665

B2: $7(2.095)$

B1: $120°$ or 2.095 rad

Q9:

B2: $180\,000+(n-1)(16\,200)$

B1: $a=180\,000$ or $d=16\,200$

$n=13$

Q10:

(a) $\vec{PS}=5y$

(b)) B2: $\overrightarrow{PT}=\frac{1}{4}\overrightarrow{PR}$ or $\overrightarrow{RT}=\frac{3}{4}\overrightarrow{RP}$

B1: $\overrightarrow{QT}=\overrightarrow{QP}+\overrightarrow{PT}$ or $\overrightarrow{QT}=\overrightarrow{QR}+\overrightarrow{RT}$

(b) $-9x+\frac{5}{4}y$

Q11:

(*a*) B1: $\frac{1}{2}\times\frac{1}{2}$	(*a*) $\frac{1}{4}$
(*b*) B1: $\left(\frac{1}{2}\times\frac{1}{2}\right)$	(b) $\frac{1}{2}$

Q12:

$(2 \times 1 \times 3 \times 2) \times (2 \times 1 \times 1) = 24$

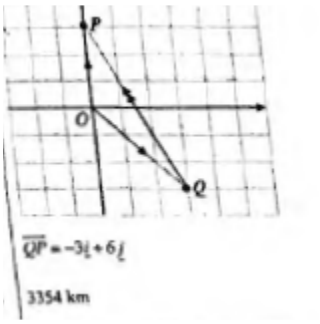
$24 \times 6 = 144$

$144 + 144 = 288$

Q13:

ii) $\overrightarrow{QP} = -3i + 6j$

b) 3354 km



Q14:

a) y = 2

b) Cicak yang berada di Q dan 13.42

Q15:

$3\ ms^{-1}$

B2: $12\pi = 2\pi(2)\times\frac{dr}{dt}$ or equivalent

B1: $\frac{dA}{dt} = 12\pi$ or $\frac{dA}{dr} = 2\pi r$

Q16:

152.37

B1 : 30(5.097) or 2(3.142)(30) -1.205(30) or equivalent

2705.8

B1 : $\frac{1}{2}(30^2)(5.079) + \frac{1}{2}(24.72)(34)$or
$\frac{1}{2}(30^2)(5.079) + \frac{1}{2}(30)(34)\sin 55.48°$

Q17:

(a) 45

B1: $p + 30 = 75$

(b) 100

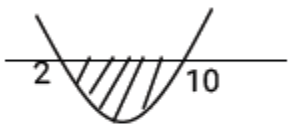
Q18:

294

B1 : $\frac{14}{2}[2(8)+13(2)]$

Q19:

$2 < x < 10$

B3 : $(x-2)(x-10) < 0$ or B3 : 

B2 : $-x^2 + 12x - 20 > 0$

B1 : $x(12 - x) > 20$

Q20:

(a)	205 , 209.1 , 213.282 *Nota:* *Kalau calon senaraikan lebih daripada tiga, semua kena betul*
(b)	17,338.78 seconds or 288.98 minutes or 4.82 hours or 4 hours 49 minutes $\frac{205(1.02^{50}-1)}{1.02-1}$ *Nota:* *Terima* $\frac{(3'25'')(1.02^{50}-1)}{1.02-1}$

Q21:

(a)	2.095 rad
(b)	565.65 m^2 $\frac{1}{2}(24)^2(2.095)-\frac{1}{2}(6)^2(2.095)$ 24 seen

Q22:

$\lambda = \frac{2}{3}$
$A'C = 2\underline{i} + 6\underline{j}$ or $\overrightarrow{CD} = \underline{i} + 3\underline{j}$
*accept $\begin{pmatrix} 2 \\ 6 \end{pmatrix}$ or $\begin{pmatrix} 1 \\ 3 \end{pmatrix}$
$A'(3,-4)$

Q23:

$17.6\pi \text{ cm}^3$	3
$176\pi \times (0.1)$	B2
$2_{\pi}(4)(22)$	B1

Q24:

$k = 12.31°, 77.69°, 192.31°, 257.69°$	4
$2k = 24.62°, 155.38°, 384.62°, 515.38°$	B3
$2(\sin 2k) = \frac{3}{3.6}$	B2
$kos\ y = \frac{3}{3.6}$	B1

Q25:

234	3
$L = \frac{1}{2}(30)^2(0.52)$	B2
$15.6 = j(0.52)$	B1

Q26:

(a) $5! = 120$	B1
(b) 72	2
$2 \times 4!$	B1

Q27:

(a) 336	1
(b) 1680	2
${}^2P_2 \times 7 \times {}^6P_3$	B1

Q28:

$h = 4$	3
$-5 = \left(\frac{3}{2}h^2 + 1\right) \times (-0.2)$	B2
$\frac{dV}{dh} = \frac{3}{2}h^2 + 1$ or $\frac{dV}{dt} = -5$	B1

Q29:

$52\ m$	4
2 x [12(2) + (4-2)]	B3
$48\text{-}24x = 0$	B2
$L = 12x(4 - x)$	B1

Q30:

B3: $\frac{15}{2}\left[2(2\pi r) + 14(2\pi)\right] = 270\pi$	2
B2: $\frac{15}{2}\left[2a + 14(2\pi)\right]$ or $\frac{15}{2}\left[4\pi r + 14d\right]$	
B1: $a = 2\pi r$ or $d = 2\pi$	

Q31:

B2: $\frac{a(1-0.9^7)}{1-0.9}$ or $\frac{\frac{25}{9}(1-r^7)}{0.1}$ B1: $a=\frac{25}{9}$ or $r = 0.9$	14.49

Q32:

B3: $90\pi x - 15\pi x^2 = 0$ B2: $\pi x^2(45-5x)$ B1: $r = x$	6

Q33:

B3: $\delta M = 16 \times 0.02$ B2: $\frac{dM}{dk} = 16$ B1: $\delta k = 0.04$ or $\frac{dM}{dk} = \frac{8k}{(3-k^2)^2}$	0.64

Q34:

B2: $\frac{1}{2}(20^2)(2.6211)$ - $\frac{1}{2}(7^2)(2.6211)$ B1: $\frac{1}{2}(7^2)(2.6211)$ or $\frac{1}{2}(20^2)(2.6211)$	25

Q35:

$B3: \pi\left[-\frac{y^3}{3}+6y^2-27y\right]_6^9 \quad or \quad \frac{1}{2}\left(\frac{4}{3}\pi(3)^3\right)$ $B2: \pi\int_6^9\left(-y^2+12y-27\right)dy \quad or \quad \left(\frac{4}{3}\pi(3)^3\right)$ $B1: \int_6^9 \pi x^2 dy \; or \; 9 \; or \; (0,6)(0,9) \quad \text{or} \quad r=3$	18π

Q36:

	$(a) \quad \frac{1}{6}$
(b) B1 : $\left(\frac{1}{6}\times\frac{1}{6}\right)$	(b) $\frac{5}{36}$

Q37:

$(24-2x)(36-2x) = 364$
$x^2 - 30x + 125 = 0$
$(x-25)(x-5) = 0$
$x = 25$ (rejected) x = 5

Q38:

$(x+2)^2 + (x+5)^2 = (7)^2$
$x^2 + 4x + 4 + x^2 + 10x + 25 = 49$
$2x^2 + 14x + 29 - 49 = 0$
$2x^2 + 14x - 20 = 0$
$x^2 + 7x - 10 = 0$ *(shown)*
$x = 1.22$ *or* $x = -8.22$
Radius of circle with centre A= 1.22

Q39:

$120\,000\,(\frac{8}{7})^n > 300\,000$

$(\frac{8}{7})^n > 2.5$

$n > \frac{\log 2.5}{\log 1.1429}$

$n > 6.86$

$n = 7$ tahun

Q40:

$T = 30(1.2)^x$

$1500 = 30(1.2)^x$

$(1.2)^x = 50$

$x \log 1.2 = \log 50$

$x = \frac{\log 50}{\log 1.2}$

$x = 21.45$ saat

Q41:

Persamaan garis lurus PR

$y - 2 = -\frac{3}{2}(x - 16)$

$y = -\frac{3}{2}x + 26$

Koordinat kapal karam R

$\frac{2}{3}x = -\frac{3}{2}x + 26$

$\frac{13}{6}x = 26$

$x = 12$

Gantikan nilai x = 12 dalam persamaan $y = \frac{2}{3}x$

$y = \frac{2}{3}(12)$

$= 8$

R (12, 8)

(b) Persamaan sukatan terapung, Anggapkan $L(x, y)$

$LR = 100$

$\sqrt{(x-12)^2+(y-8)^2} = 100$

$x^2 - 24x + 144 + y^2 - 16y + 64 - 10000 = 0$

$x^2 + y^2 - 24x - 16y - 9792 = 0$

Q42:

(a) $\left(\frac{3+5}{2}, \frac{4+0}{2}\right)$

$P\ (4,2)$

(b) $TO = 5$

$\sqrt{(x-0)^2+(y-0)^2} = 5$

$x^2 + y^2 = 25$

$x^2 + y^2 - 25 = 0$

Q43:

(a) $\frac{70+62+59+75+68}{5} = 66.8$

$\frac{70^2+62^2+59^2+75^2+68^2}{5} - (66.8)^2 = 5.706$

Salawati

b) $\frac{334+x}{6} > 67.5$

$x > 71$

Q44:

a) $OY = OX + XY = \begin{pmatrix} 400\cos 50° \\ 400\sin 50° \end{pmatrix} + \begin{pmatrix} 0 \\ 50 \end{pmatrix} = \begin{pmatrix} 257.115 \\ 356.418 \end{pmatrix}$

$|OY| = \sqrt{(257.115)^2 + (356.418)^2} = 439.48\text{mph}$

b) $\tan^{-1}\frac{257.115}{356.418} = 35.81°$

Final bearing of plane $= 035.81°$

Q45:

$$^{3}C_{1}\times{}^{6}C_{2}+{}^{3}C_{2}\times{}^{6}C_{1}$$
$$= 63$$

Q46:

$$^{8}P_{2}\times{}^{5}P_{3}$$
$$= 3360$$

Q1:

1a.	**Method 1 :** $y = -(x^2 - 2x)$ $= -[(x-1)^2 - 1]$ $= -(x-1)^2 + 1$ Height = 1 m **Method 2 :** $x = -\frac{b}{2a}$ $= -\frac{2}{2(-1)}$ $= 1$ $y = -1^2 + 2(1) = 1$ Height = 1m **Method 3 :** $y = -x^2 + 2x$ $\frac{dy}{dx} = -2x + 2 = 0$ $x = 1$ $y = -(1)^2 + 2(1) = 1$ Height = 1 m	Use completing the square method K1 N1 Height = 1m Use $x = -\frac{b}{2a}$ to find x and y. K1 N1 Height = 1m Use $\frac{dy}{dx} = 0$ to find x and y K1 N1 Height = 1m
1b.	$x = 0, y = 0$ or $x = 2, y = -(2)^2 + 2(2) = 0$ (0,0) and (2,0) $y = a(x-1)^2 + 2$ at (0,0) or (2,0) $0 = a(0-1)^2 + 2$, a = -2 $y = -2(x-1)^2 + 2$	K1 Use x=0 or x=2 to find y K1 Use (0,0) Or(2,0) to find a. N1 a=-2 N1 $y = -2(x-1)^2 + 2$

Q2:

0.7855 rad. P1

$Area = \frac{1}{2}r^2\theta + \frac{1}{8}(r\theta h)$

$\frac{1}{2}(12)^2(\frac{\pi}{4})$ K1 K1 $\frac{1}{8}(2)(\pi)(12)(8)$

56.556 cm^2 75.408 cm^2

Area = 56.556* + 75.408* K1

131.964 cm^2 N1

Total cost = 131.964 x 0.03 N1

RM 3.959

Q3:

$3x + y = 320$

$x^2 - 100x + 5y + xy - 3025 = 0$

$y = 320 - 3x$

$x^2 - 100x + 5(320 - 3x) + x(320 - 3x) - 3025 = 0$

$(x - 95)(2x - 15) = 0$

$x = 7.5, x = 95$

$y = 729.5, y = 35$

$x = 95, y = 35$

$600 + 650 = 1250$

$1250 \times RM15 = RM18750$, Yes

Q4:

$20\,000 \bullet 1.05^t > 50000$

$$1.05^t > \frac{5}{2}$$

$$log_{10}(1.05^t) > log_{10}\frac{5}{2}$$

$$t\ log_{10}(1.05) > log_{10}\frac{5}{2}$$

$$t > \frac{log_{10}\frac{5}{2}}{log_{10}1.05}$$

t > 18.78

t = 19 tahun

(b)

$P(20) = 20\,000 \bullet 1.05^{20}$

$P(20) = RM53\,065.95$

$20\,000 \bullet 1.03^t = 50000$

$$1.03^t = \frac{5}{2}$$

$$log_{10}(1.03^t) > log_{10}\frac{5}{2}$$

$$t\ lo_{10}(1.03) > log_{10}\frac{5}{2}$$

$$t > \frac{log_{10}\frac{5}{2}}{log_{10}1.03}$$

t > 30.999

t = 31 tahun

Q5:

.(a) From the sector $OPYS$ length of chord $PS = 20$ cm

$$2r \sin\frac{\theta}{2} = 20$$

$$2 \times 15 \times sin\left(\frac{\angle POS}{2}\right) = 20$$

$$sin\left(\frac{\angle POS}{2}\right) = \frac{2}{3}$$

$$\angle POS = 1.4595\ rad$$

(b) From ΔOTS, using the Phtagaras' Theorem

$$OT = \sqrt{15^2 - 10^2}$$

$$= 11.18 \text{ cm}$$

$$TY = OY - OT$$

$$= 15\text{-}11.18$$

$$= 3.82$$

Hence the vertical height from the lowest point Y to the base of the pail is $20 - 3.82 = 16.18$ cm

(c) Area of segment $PSY = \frac{1}{2}r^2(\theta - \sin\theta)$

$$= \frac{1}{2} \times 15^2 \times (1.4595 - \sin 1.4595)$$

$$= 52.3898 \text{ cm}^2$$

Q6:

a) $h = \frac{32}{x^2}$

jumlah luas permukaan =

$L = 2\pi(x)(2x) + 2\pi(x)(\frac{32}{x^2})$

b) $\frac{dL}{dx} = 8\pi x - \frac{64\pi}{x^2}$,

$$8\pi x - \frac{64\pi}{x^2} = 0,$$

$$x = 2$$

c) $\frac{dx}{dL} = \frac{x^2}{8\pi x^3 - 64\pi}$,

$$\frac{dx}{dt} = \frac{dx}{dL} \times \frac{dL}{dt}$$

$$= \frac{9}{152\pi} \times 38$$

$$= \frac{9}{4\pi}$$

d) $\delta L = \frac{dL}{dx} \times \delta x$, $(24\pi - \frac{64}{9}\pi) \times 0.004 = 0.2122$

Q7:

a)

n	1	2	3	4
T_n	1	5	9	13

b) d=5-1
=4

c) T_n= 1 + (n-1)(4)
= 4n -3

d) T_{14} = 1 + (13)(4)
= 53

Q8:

a) W = 26 + 0.13 (n)

b) i) W = 26 + 0.13 (45)
= RM 31.85

ii) 26 + 0.13n= 78
n = 400 minutes

Q9:

(*a*) Plot the graph of log *N* against *t*/ Plot graf log *N* melawan *t*

(*b*) (i) 1995
(ii) $t > 25.6$
(iii) 77.88%

(*c*) $N = 1995(0.881)^t$

Q10:

a) When y = 3,

$$3 = 4 - \frac{x^2}{4}$$

$$x^2 = 4$$

$$x = 2$$

x value at point A = –2 and x value at point D = 2

BC = 2 + 2 = 4m

b) Surface area of the front door

$$= \int_{-2}^{2}\left(4 - \frac{x^2}{4}\right)dx = \left[4x - \frac{x^3}{12}\right]_{-2}^{2} = 14\frac{2}{3}\text{m}^2$$

c) Surface area of the new front door

$$= 4 + 14\frac{2}{3}\text{m}^2 = 18\frac{2}{3}\text{m}^2$$

Q11:

(a) (i) $P(X \leq 400) = P\left(z \leq \frac{400 - 420}{50}\right)$

$= P(z \leq -0.4)$

$= 0.3446$

(ii) $P(X > w) = 0.7$

$$P\left(z > \frac{w - 420}{50}\right) = 0.7$$

$$P\left(z < \frac{w - 420}{50}\right) = 0.3$$

$$\frac{w - 420}{50} = -0.524$$

$w = 393.8$ // 394

(b) (i) $^{40}C_{18}(0.25)^{18}(0.75)^{22} = 0.002943$

(ii) total of questions answered correctly/
Jumlah soalan dijawab dengan betul = 24

$^{40}C_{9}(0.25)^{9}(0.75)^{31} = 0.0781$

Q12:

Perimeter = 52 cm $20 + 4x + 4(4y + x) = 52$ or $5x(4y+x) = \pi x^2\left(\frac{15y}{\pi}\right)$	**P1**
$(x = 0$ diabaikan$)$ $x = 4 - 2y$ or $y = \frac{4-x}{2}$	**P1**
$20y + 5x - 15xy = 0$ $20y + 5(4-2y) - 15(4-2y)y = 0$	**K1 Eliminate x/y**
$3y^2 - 5y + 2 = 0$ $(y-1)(3y-2) = 0$	**K1 Solve quadratic equation**
$y = 1, \quad -\frac{2}{3}$	**N1**
When $y = 1, \quad x = 4 - 2(1)$ $= 2$	**N1**
Base area of the mold = $5(4y+x)$ $= 5[4(1)+2]$	**K1**
$= 30 \text{ cm}^2$	**N1**

Q13:

(a)

$\sin x \cot^2 x + \sin x$

$= \sin x \left(\cot^2 x + 1 \right)$

$= \sin x \, \text{cosec}^2 x$

$= \text{cosec}\, x$

K1

N1

(b)

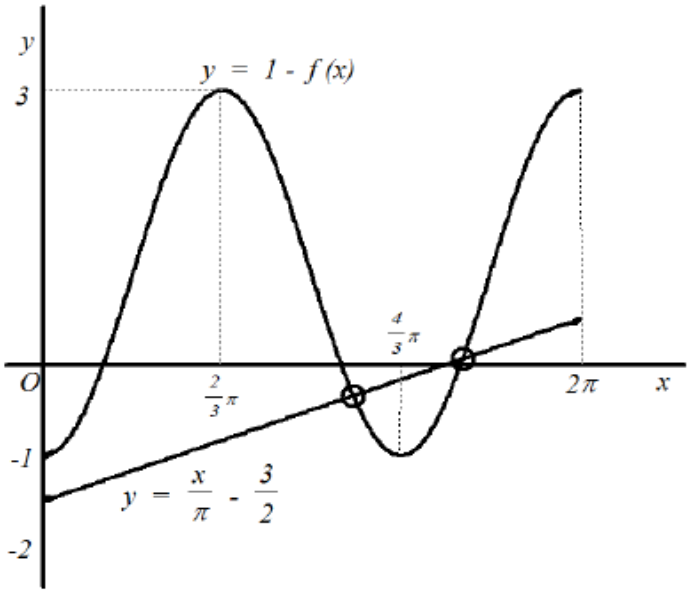
(i) $y = 2 \cos \frac{3}{2} x$

P1 graph cosine curve

P1 amplitude 2

P1 cycle $\frac{3}{2}$ cycle 0 to 2π

(ii)



P1 $-f(x)$

P1 shifted graph

$1 - 2 \cos \frac{3}{2} x$

K1 $y = \frac{x}{\pi} - \frac{3}{2}$

(iii)

$\frac{5}{2} - f(x) - \frac{x}{\pi} = 0$

$y = \frac{x}{\pi} - \frac{3}{2}$

N1 equation $y = \frac{x}{\pi} - \frac{3}{2}$

Number of solutions = 2

N1

Q14:

$4pq + \pi p^2 = 240\pi$	(non linear)	1
$q = \frac{p}{2}\pi + 2\pi$	(linear)	1
$4p\left(\frac{p}{2}\pi + 2\pi\right) + \pi p^2 = 240\pi$	(eliminate q)	1
$p = \frac{-8 \pm \sqrt{(8)^2 - 4(3)(-240)}}{2(3)}$		1
$p = 7.71\ cm$		1
$q = 18.40\ cm$		1

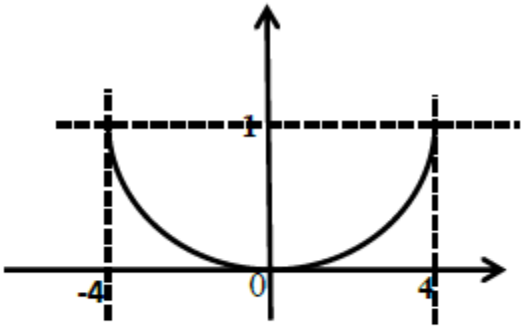
Q15:

$m_{PR} = -\frac{3}{2}$	1
$y - 2 = -\frac{3}{2}(x - 16)$	1
$y = -\frac{3}{2}x + 26$	1
$\frac{2}{3}x = -\frac{3}{2}x + 26$ solve simultaneous equation	1
$x = 12$	1
R (12, 8)	1
$\frac{1}{2}\|0 + 24 + 0 - 0 - 128 - 0\|$	1
52	1
$\sqrt{(x - 12)^2 + (y - 8)^2} = 150$	1
$x^2 + y^2 - 24x - 16y - 22292 = 0$	1

Q16:

(a) $A_1 = \pi k^2,\ A_2 = \frac{\pi k^2}{4},\ A_3 = \frac{\pi k^2}{16},\ A_4 = \frac{\pi k^2}{64}$	P1
$r = \frac{1}{4}$	
$\frac{a\left[1-\left(\frac{1}{4}\right)^4\right]}{1-\frac{1}{4}} = \frac{2125}{16}\pi$	K1
$a = 100\pi\ cm^2$	N1
(b) $100\pi\left(\frac{1}{4}\right)^{n-1} = \frac{25}{4}\pi$ or $T_2 = 100\pi\left(\frac{1}{4}\right)$	K1
$n = 3$	N1
(c) $S_\infty = \frac{100\pi}{1-\frac{1}{4}}$	K1
$= 400\pi\ cm^2$	N1

Q17:

(a)  $y = kx^2$ pada titik (4,1) $1 = k(4)^2$ $k = \frac{1}{16}$	 K1 N1
(b) $(10 \times 8) - \int_{-4}^{4} \frac{1}{16} x^2$ $80 - \left[\frac{1}{48} x^3 \right]_{-4}^{4}$ $80 - \left[\left(\frac{4}{3} \right) - \left(\frac{-4}{3} \right) \right]$ $77\frac{1}{3}$	 K1 K1K1 K1 N1

Q18:

(a) Find k (Substitute any corresponding value of x °C and y °F) $k=32$ **P1**

$substitute\ x = 3\ into\ y = 1.8x + 32$ **K1**

89.6 °F **N1**

(b) Use $f^{-1}(x) = y\ or\ x = f(y)$ **K1**

$1.8y + 32 = x$

$f^{-1}(x) = \frac{x-32}{1.8}$ **N1**

Q19:

(a) $a = 6\ \ or\ \ r = 0.6$ **P1**

Use $T_5 = 6(0.6)^4$ **K1**

$\frac{486}{625}$ **N1**

OR listing method

$6, \frac{18}{5}, \frac{54}{25}, \frac{162}{125}, \frac{486}{625}$

(b) Use $S_4 = 6\left(\frac{1-0.6^4}{1-0.6}\right)$ **K1** **K1** $10 + {}^{*}T_5 + 2 * S_4$

$\frac{23056}{625}$ **N1**

OR listing method

$10 + 2(6) + 2\left(\frac{18}{5}\right) + 2\left(\frac{54}{25}\right) + 2\left(\frac{162}{125}\right) + \frac{486}{625}$

Q20:

(a)

$6(5^t) + (5^t)(5^1) + 2\left(\frac{5^t}{5^1}\right) = 7125$ **K1**

$5^t = 625$ **K1**

$t = 4$ **N1**

(b)

$log_3 x = m \text{ or } log_3 y = n$ **P1**

$log_9 27 + log_9 y - log_9 x^4$ **K1**

$\frac{log_3 27}{log_3 9} + \frac{log_3 y}{log_3 9} - \frac{log_3 x^4}{log_3 9}$ **K1**

$\frac{3}{2} + \frac{n}{2} - \frac{4log_3 x}{2}$ **K1**

$\frac{3}{2} + \frac{n}{2} - 2m$ **N1**

Q21:

(a)	$36 \text{ or } 36, 27, 20.25, \ldots\ldots \text{or } r = 0.75$	K1
	$T_n = 1.52 \quad \text{or} \quad 36(0.75)^{n-1} = 1.52$	K1
	$(n-1)\log 0.75 = \log\left(\frac{1.52}{36}\right) \text{ or } n - 1 = \frac{\log\left(\frac{1.52}{36}\right)}{\log 0.75}$	K1
	$n = 12$	N1
(b)	$\frac{36}{(1-0.75)}$	K1
	$48 + 2\left(\frac{36}{1-0.75}\right)$	K1
	336 cm	N1

Q22:

(a) (i)	$\frac{100.5+150.5}{2}$	K1
	125.5 (accept without working)	N1
(ii)	$\frac{75.5(10)+125.5(40)+175.5(10)+225.5(30)+275.5(20)}{110}$	K1
	180.05	N1
(b)	200.5 or 60 or 30	P1
	$200.5+\left(\frac{82.5-60}{30}\right)50$	K1
	238	N1

Q23:

(a)	$\frac{2}{5}x^2-12x+50=0$	K1
	$(x-25)(x-5)=0$	K1
	$x=25\ ,\ x=5$	
	Width = 25 – 5 = 20 unit	N1
(b)	$\frac{dy}{dx}=\frac{4}{5}x-12$ OR $y=\frac{2}{5}\left[(x-15)^2-100\right]$	K1
	x = 15 OR $y=\frac{2}{5}(x-15)^2-40$	N1
	y = – 40 or max depth = 40	N1

Q24:

(a) r = 2 $\frac{1\left(2^n-1\right)}{2-1}=255 \quad or \quad \frac{2\left(2^n-1\right)}{2-1}=254$ $n = 8 \qquad or \qquad n = 7$ Number of rows = 15	K1 N1 N1
(b) $a = 1,\ n = 8$ or $a = 2,\ n = 7$ (2^7) or $2(2^{7-1})$ (Note: or correct listing P1 K1) 128	P1 K1 N1

Q25:

(a) A (30,40) dan C(60,20)	P1
(b) D (90, 60) $\sqrt{90^2+60^2}$ 108.17	P1 N1 K1
(c) $DA : DC = 2 : 1$ $\frac{2(60)+30}{3} \quad or \quad \frac{2(20)+40}{3}$ $\left(50, \frac{80}{3}\right)$	P1 K1 N1

Q26:

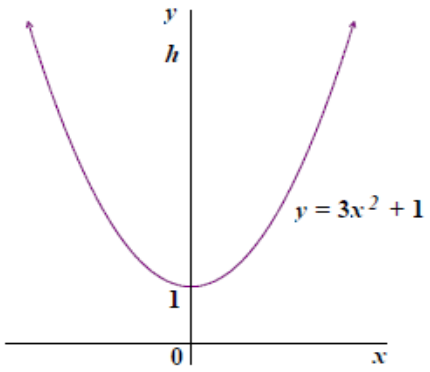
(a)	(i) $9 = 4a + 11$	**K1**
	$a = -\frac{1}{2}$	**N1**
(ii)	$\pi \int_{9}^{11} 22 - 2y \, dy$ **K1**	
	$\frac{1}{3}\pi(2^2)9$ **K1** untuk kon	
	$\pi\left[22y - \frac{2y^2}{2}\right]_{9}^{11} + 12\pi$	**K1** pengamiran
	$\pi \int_{9}^{11} 22 - 2y \, dy + \frac{1}{3}\pi(2^2)9$	**K1** penambahan
	16π	**N1**
(b)	$\frac{dy}{dx} = -2$	**K1**
	$\delta y = (-2)(-0.01)$	**K1** (terima $\delta x = 0.01$)
	0.02	**N1**

Q27:

5		
(a)	$T_{15} = 1 + (14)(2)$	**K1**
	$= 29$	**N1**
(b)		
	$T_{20} = 1 + (19)(2)$	**K1**
	$= 39$	
	$S_n = \frac{10}{2}(3 + 39)$ or equivalent	**K1**
	$= 210$	**N1**
(c)	$\frac{n}{2}(2(1) + (n-1)4) = 435$	**K1**
	$4n^2 - 2n - 870 = 0$	
	$(n-5)(2n+29) = 0$	**K1**
	$n = 15 \quad n = -\frac{29}{2}$	
	Bilangan baris $= 2 \times 15$	
	$= 30$	**N1**

Q28:

(a)



Shape of quadratic function	P1
Minimum = 1	P1
Complete graph with axis of symmetry $x = 0$	P1

(b)

$$x^2 = \frac{y-1}{3}$$

$$\pi \int_1^h \frac{y-1}{3}\,dy = \frac{9}{6}\pi$$ K1

$$\frac{1}{3}\left[\frac{y^2}{2} - y\right]_1^h = \frac{9}{6}$$

$$\left(\frac{h^2}{2} - h\right) - \left(\frac{1}{2} - 1\right) = \frac{9}{2}$$ K1 integrate and sub. the limi correctly

$$h^2 - 2h - 8 = 0$$

$$(h-4)(h+2) = 0$$ K1

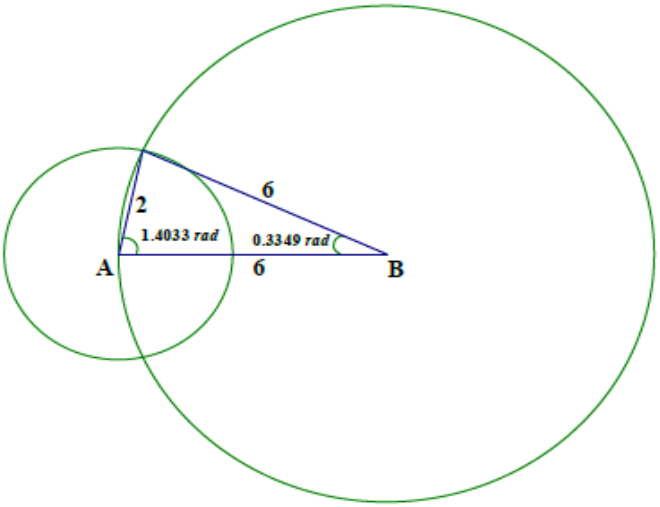
$$h = 4 \quad , \quad h = -2$$ N1

Panjang Jeli

$$4 - 1$$

$$= 3$$ N1

Q29:



(a)

$6^2 = 2^2 + 6^2 - 2(2)(6)\cos A$

$24\cos A = 2^2 + 6^2 - 6^2 = 4$

$\cos A = \frac{1}{6}$

$\measuredangle A = 80\cdot4059^\circ \ @\ 1\cdot4033 rad$

K1

N1

Big circle $2\pi(6) = 12\pi$

Small circle $s = 2(2\pi - 2\times1\cdot4033 rad) = 6.953$

length $12\pi + 6\cdot953$

$= 44\cdot652$

K1 **Use** $s = r\theta$ **or** $2\pi r$

K1

N1

(b)

$A1 \ = \frac{1}{2}\times2^2(2\pi - 2\times1\cdot4033 rad) = 6.953$

$A2 \ \frac{1}{2}\times6^2(0\cdot3349 rad) - \frac{1}{2}\times6^2(\sin 0\cdot3349 rad) = 0\cdot1121$

Area $= 6\cdot953 - 2\times0\cdot1121$

$= 6\cdot729$

K1 **Use formula** $A = \frac{1}{2}r^2\theta$

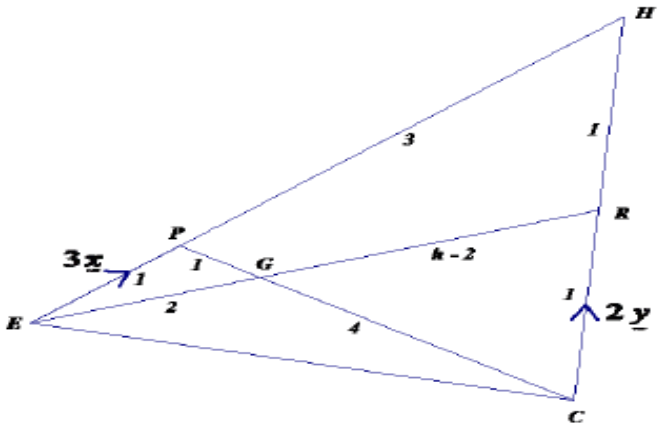
K1 θ **in rad**

K1

K1

N1

Q30:



(a)

(i) $9\underset{\sim}{x}$ — **N1**

(ii)

$\overrightarrow{PC} = \overrightarrow{PH} + \overrightarrow{HC}$

$= 9\underset{\sim}{x} - 4\underset{\sim}{y}$ — **K1**

$\overrightarrow{PG} = \frac{1}{5}\left(9\underset{\sim}{x} - 4\underset{\sim}{y}\right)$ — **K1**

$\overrightarrow{EG} = \overrightarrow{EP} + \overrightarrow{PG}$

$= 3\underset{\sim}{x} + \frac{1}{5}\left(9\underset{\sim}{x} - 4\underset{\sim}{y}\right)$ — **K1**

$= \frac{1}{5}\left(24\underset{\sim}{x} - 4\underset{\sim}{y}\right)$ — **N1**

(b)

$\overrightarrow{ER} = \overrightarrow{EH} + \overrightarrow{HR}$

$= 12\underset{\sim}{x} - 2\underset{\sim}{y}$ — **K1**

$\frac{\overrightarrow{EG}}{\overrightarrow{ER}} = \frac{\frac{2}{5}\left(12\underset{\sim}{x} - 2\underset{\sim}{y}\right)}{12\underset{\sim}{x} - 2\underset{\sim}{y}}$ — **K1**

$EG : ER = 2 : 5$

$h = 5$ — **N1**

(c)

$\frac{\frac{1}{2} \times 2 \times tinggi}{\frac{1}{2} \times 3 \times tinggi}$ — **K1**

$= \frac{2}{3}$ — **N1**

Q31:

(*a*) 23.49

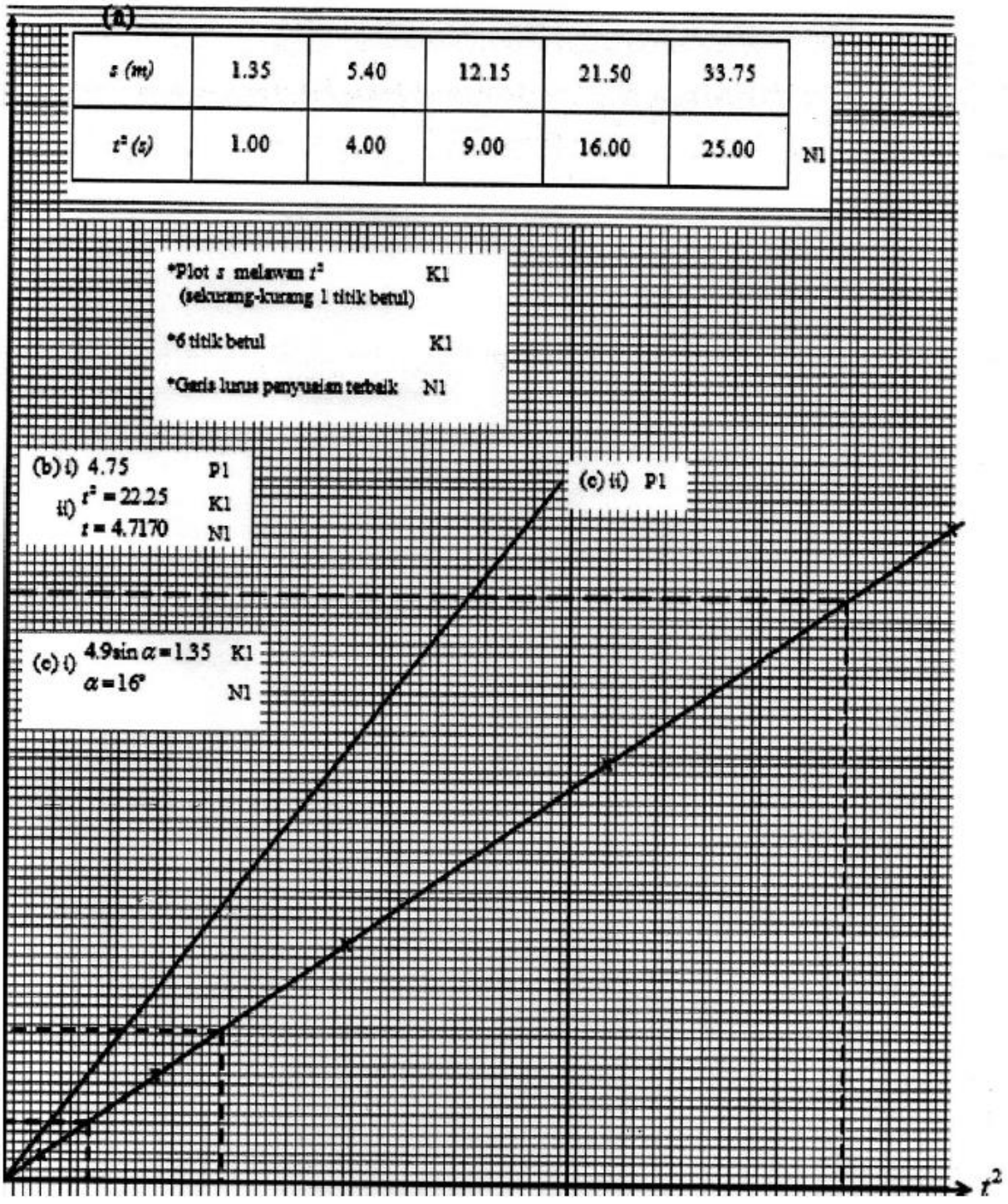
(*b*) 382.84

(*c*) $\frac{6800}{9}\pi$

Q32:

(*a*)	(i)	$\frac{x}{8}+\frac{y}{5}=1$	K1
		$5x+8y-40=0$	N1
	(ii)	$m=\frac{8}{5}$	P1
		$y-5=\frac{8}{5}(x-0)$	K1
		$y=\frac{8}{5}x+5$	N1
(*b*)		$(x-0)^2+(y-0)^2=10^2$	K1
		$x^2+y^2=100$	N1

Q33:


(a)
s (m) 1.35 5.40 12.15 21.50 33.75
t² (s) 1.00 4.00 9.00 16.00 25.00
N1
*Plot s melawan t² K1
(sekurang-kurang 1 titik betul)
*6 titik betul K1
*Garis lurus penyuaian terbaik N1
(b) i) 4.75 P1
ii) t² = 22.25 K1
t = 4.7170 N1
(c) i) 4.9sin α = 1.35 K1
α = 16° N1
(c) ii) P1
t²

Q34:

$2(x+5)+2y=85 \quad or \quad y(x+5)=424$	P1
$x=\dfrac{75-2y}{2}$	P1
$y\left(\dfrac{75-2y}{2}\right)+5y=424$	K1
$(2y-53)(y-16)=0 \quad \text{or} \quad y=\dfrac{-(-85)\pm\sqrt{(-85)^2-4(2)(848)}}{2(2)}$	K1
$y=26.5,\ y=16 \quad and \quad x=1, x=21.5$	K1
$Panjang=26.5 \quad dan \quad Lebar=16$	N1

Q35:

(a)	$\dfrac{59.93}{100}\times 360° \quad \text{or} \quad \dfrac{59.93}{100}\times 2\pi$	K1
	3.766 // 3.767 rad	N1
(b)	$S_1=8(3.766)$	K1
	$S_2=5(3.766)$	K1
	$8(3.766)+5(3.766)+3+3$	K1
	54.96	N1
(c)	$A_1=\dfrac{1}{2}(8)^2(3.766)$	K1
	$A_2=\dfrac{1}{2}(5)^2(3.766)$	K1
	$\dfrac{1}{2}(8)^2(3.766)-\dfrac{1}{2}(5)^2(3.766)$	K1
	73.44	N1

Q36:

$Luas = 8.75$

$xy = \frac{35}{4}$

$4xy = 35$ ——— (1)

$Perimeter = 12$

$2x + 2y = 12$

$x + y = 6$

$y = 6 - x$ ——— (2)

Gantikan (2) dalam (1)

$4x(6 - x) = 35$

$24x - 4x^2 - 35 = 0$

$4x^2 - 24x + 35 = 0$

$(2x - 5)(2x - 7) = 0$

$x = \frac{5}{2}$, $x = \frac{7}{2}$

$x = 2.5$, $x = 3.5$

$y = 3.5$, $y = 2.5$

Ukuran Bilik, Panjang = 3.5 + 2 = 5.5 *m*

Lebar = 2.5 + 2 = 4.5 *m*

Q37:

a) $T_{15} = 1 + 14(2) = 29$

b) $T_{20} = 1 + 19(2) = 39$

$S_{10} = \frac{10}{2}(3 + 39) = 210$

c) $\frac{n}{2}[2(1) + (n-1)(4)] = 435$

$n = 15$

$2 \times 15 = 30$