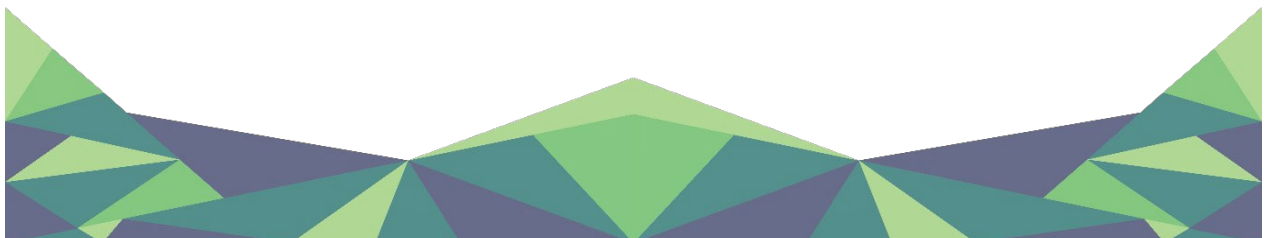


**SIJIL PELAJARAN MALAYSIA
MULAI TAHUN 2021**

**MATEMATIK
(1449)**

CONTOH-CONTOH ITEM

1449/1 – MATEMATIK KERTAS 1



KERTAS 1

- 1** Ungkapkan 0.01267 dalam bentuk piawai.
Express 0.01267 in standard form.

- A** 1.26×10^{-3}
- B** 1.26×10^{-2}
- C** 1.27×10^{-3}
- D** 1.27×10^{-2}

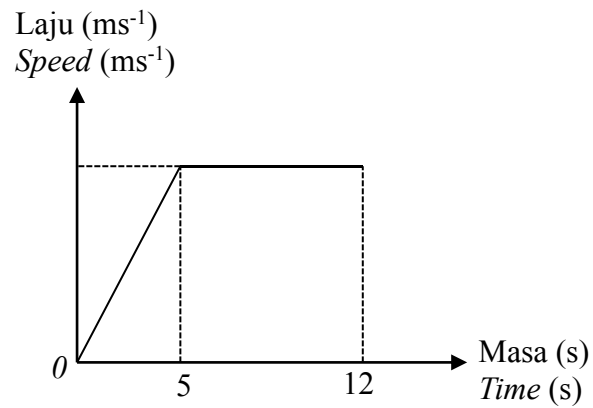
- 2** Cik Aminah bekerja sebagai seorang guru. Beliau menerima pendapatan sebanyak RM4 500. Cik Aminah juga mempunyai dua buah rumah yang disewakan sebanyak RM650 sebulan setiap sebuah. Beliau mempunyai perbelanjaan tetap sebanyak RM1 800 sebulan dan perbelanjaan tidak tetap sebanyak RM700 sebulan. Berapa aliran tunai bulanan Cik Aminah?

Cik Aminah works as a teacher. She earns RM4 500 as her income. Cik Aminah also has two houses which she rents out each of them for RM650 a month. She has fixed expenses of RM1 800 and variable expenses of RM700 in a month.

What is Cik Aminah's monthly cash flow?

- A** RM2 500
- B** RM2 650
- C** RM3 300
- D** RM4 700

- 3 Rajah 1 menunjukkan graf laju-masa.
Diagram 1 shows a speed-time graph.

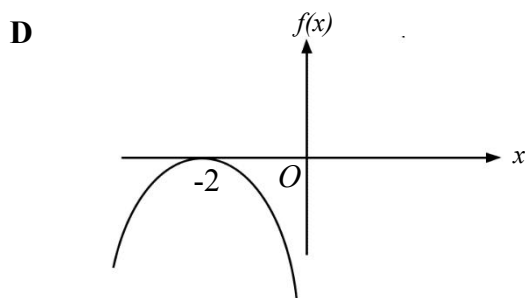
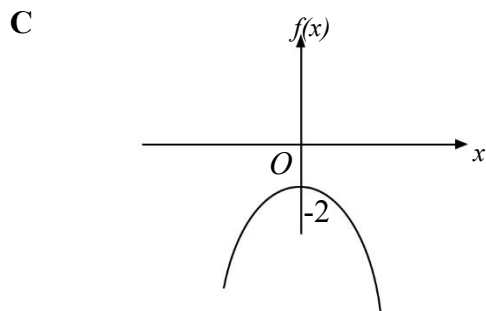
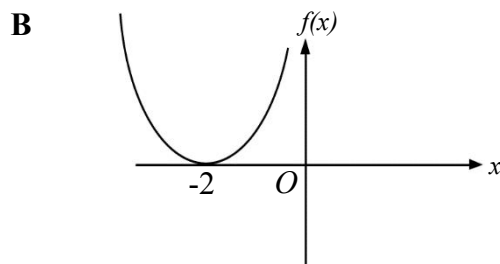
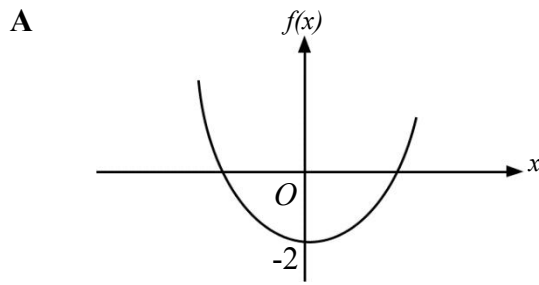


Rajah 1
 Diagram 1

Cari tempoh masa, dalam saat, laju seragam objek itu.
Find the duration of time, in seconds, of the uniform speed of the object.

- A 7
- B 8
- C 16
- D 17

- 4 Antara graf berikut, yang manakah mewakili graf fungsi, $f(x) = x^2 - 2$?
Which of the following graphs represents the function graph, $f(x) = x^2 - 2$?



- 5 Jadual 1 menunjukkan skor yang diperoleh oleh sekumpulan murid dalam satu kuiz.
Table 1 shows the score obtained by a group of students in a quiz.

Skor <i>Score</i>	1	2	3	4
Bilangan murid <i>Number of students</i>	k	10	9	21

Jadual 1
Table 1

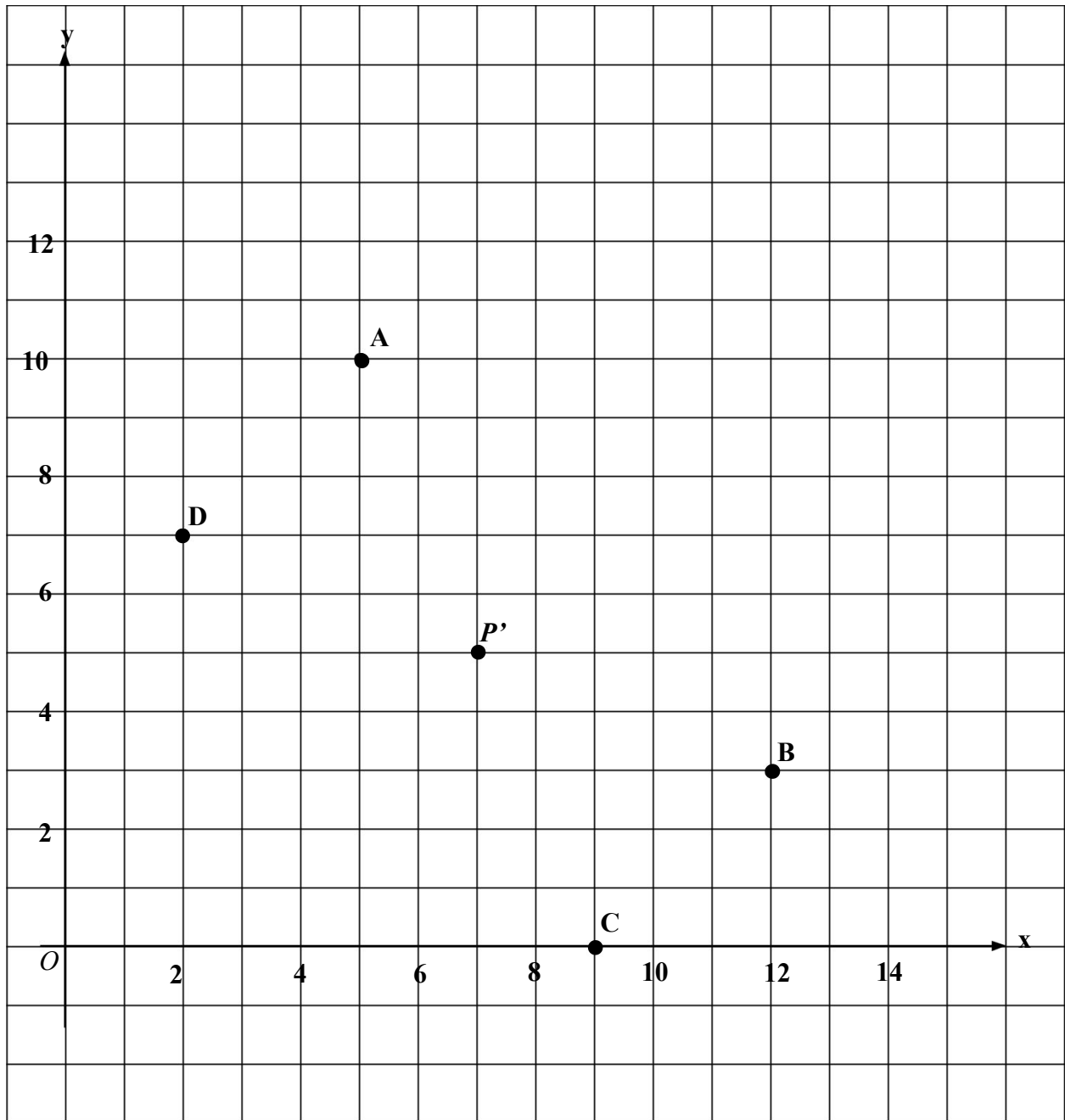
Murid yang mendapat skor melebihi 2 akan diberi hadiah. Diberi bilangan murid yang mendapat hadiah ialah 2 kali bilangan murid yang tidak mendapat hadiah. Cari nilai k .

Students who obtained score more than 2 will be given a prize. Given that the number of students who received a prize is 2 times the number of students who did not. Find the value of k .

- A 5
- B 8
- C 20
- D 50

6 Rajah 2 menunjukkan lima titik dilukis pada satah Cartes.

Diagram 2 shows five points drawn on a Cartesian plane.



Rajah 2
Diagram 2

Diberi bahawa titik P' ialah imej bagi suatu titik P di bawah suatu translasi $\begin{pmatrix} 5 \\ -2 \end{pmatrix}$.

Antara titik **A**, **B**, **C** dan **D**, yang manakah ialah titik P ?

It is given that point P' is the image of a point P under a translation $\begin{pmatrix} 5 \\ -2 \end{pmatrix}$.

*Which of the points **A**, **B**, **C** or **D**, is the point P ?*

- 7 Sebuah beg mengandungi 5 guli merah, 3 guli kuning dan beberapa guli hijau. Sebiju guli dipilih secara rawak daripada beg itu. Diberi kebarangkalian memilih sebiju guli kuning ialah $\frac{1}{6}$, cari kebarangkalian memilih sebiju guli yang **bukan** hijau.

*A bag contains 5 red marbles, 3 yellow marbles and a number of green marbles. A marble is picked at random from the bag. Given that the probability of picking a yellow marble is $\frac{1}{6}$, find the probability of picking a marble that is **not** green.*

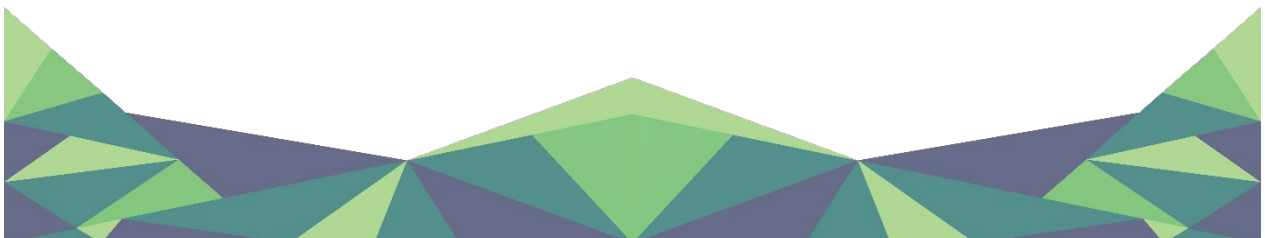
- A $\frac{4}{13}$
- B $\frac{8}{23}$
- C $\frac{4}{9}$
- D $\frac{8}{11}$

**SIJIL PELAJARAN MALAYSIA
MULAI TAHUN 2021**

**MATEMATIK
(1449)**

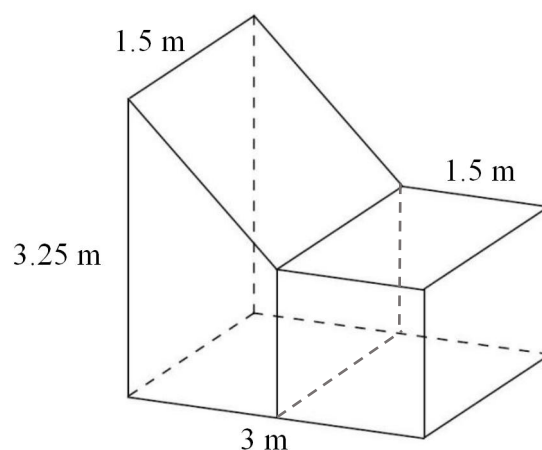
CONTOH-CONTOH ITEM

1449/2 – MATEMATIK KERTAS 2



Bahagian A
Section A

- 1 Rajah 1 menunjukkan satu gabungan pepejal yang terbentuk daripada cantuman satu kubus dengan satu prisma tegak.
Diagram 1 shows a composite solid, formed by a combination of a cube and a right prism.



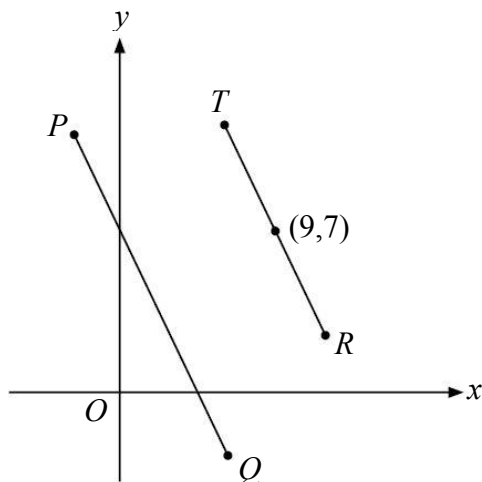
Rajah 1
Diagram 1

Hitung isi padu, dalam m^3 , gabungan pepejal itu.
Calculate the volume, in m^3 , of the composite solid.

[4 markah]
[4 marks]

Jawapan /Answer :

- 2 Rajah 2 menunjukkan dua garis selari, PQ dan TR dilukis pada suatu satah Cartes.
Diagram 2 shows two parallel lines, PQ and TR drawn on a Cartesian plane.



Rajah 2
 Diagram 2

Diberi bahawa persamaan garis lurus PQ ialah $y = -2x + 7$.

It is given that the equation of the straight line PQ is $y = -2x + 7$.

- (a) Cari persamaan garis lurus TR .
Find the equation of the straight line TR .
- (b) Nyatakan pintasan- x bagi garis lurus TR .
State the x -intercept of the straight line TR .

[4 markah]
 [4 marks]

Jawapan / Answer :

(a)

(b)

- 3 (a) Nyatakan akas bagi implikasi di bawah. Seterusnya nyatakan sama ada akas tersebut adalah benar atau palsu.
State the converse for the following implication. Hence, state whether the converse is true or false.

Jika $m < 8$, maka $m < 12$

If $m < 8$, then $m < 12$

- (b) Tulis Premis 2 untuk melengkapi hujah berikut:
Write down Premise 2 to complete the following argument:

Premis 1 : Jika $y = mx + c$, maka m ialah kecerunan bagi garis lurus itu.

Premise 1 : If $y = mx + c$, then m is the gradient of the straight line.

Premis 2 : _____.

Premise 2 : _____.

Kesimpulan : $y \neq mx + c$

Conclusion : $y \neq mx + c$

[3 markah]
 [3 marks]

Jawapan / Answer :

(a)

(b)

- 4 Jadual 1 menunjukkan pergerakan suatu objek yang bergerak di antara P dan Q di mana jarak PQ ialah 35 m.

Table 1 shows the movement of an object that moves between P and Q such that the distance of PQ is 35 m.

Masa (minit) Time (minute)	0	1	2	3	4	5	6
Jarak dari P (m) Distance from P (m)	0	10	20	20	20	35	25

Jadual 1
Table 1

- a) Pada ruang jawapan, lukis graf jarak-masa berdasarkan Jadual 1.
On the answer space, draw the distance-time graph based on Table 1.

[2 markah]

[2 marks]

- b) Hitung laju, dalam ms^{-1} , objek itu dalam tempoh 2 minit pertama.
Calculate the speed, in ms^{-1} , of the object in the first 2 minutes.

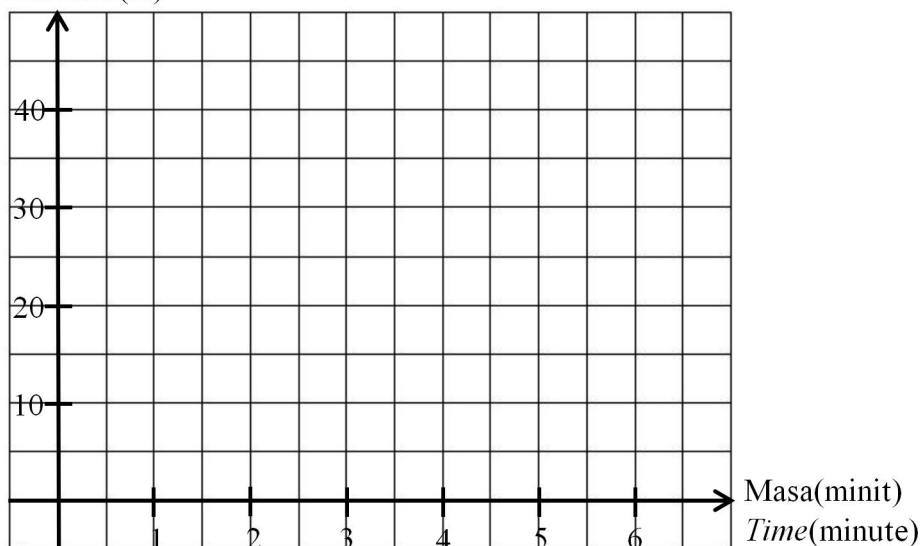
[2 markah]

[2 marks]

Jawapan / Answer:

(a)

Jarak(m)
Distance(m)



(b)

Bahagian B
Section B

- 5 (a) Tentukan sama ada titik- titik berikut memuaskan ketaksamaan yang
Determine whether the following points satisfy the correct inequalities:
betul:

(i) (4, 2) memuaskan $y < x - 4$ atau $y > x - 4$

(4, 2) satisfies $y < x - 4$ or $y > x - 4$

(ii) (3, 5) memuaskan $y < -2x + 8$ atau $y > -2x + 8$

(3, 5) satisfies $y < -2x + 8$ or $y > -2x + 8$

(iii) (2, 3) memuaskan $y < \frac{1}{2}x + 3$ atau $y > \frac{1}{2}x + 3$

(2, 3) satisfies $y < \frac{1}{2}x + 3$ or $y > \frac{1}{2}x + 3$

- (b) Berdasarkan jawapan di 11(a), lukis dan lorek rantau yang memuaskan kesemua ketaksamaan itu pada ruang jawapan di bawah.

Based on the answer in 11(a), draw and shade the region that satisfies all the inequalities in the answer space below.

[9 markah]
[9 marks]

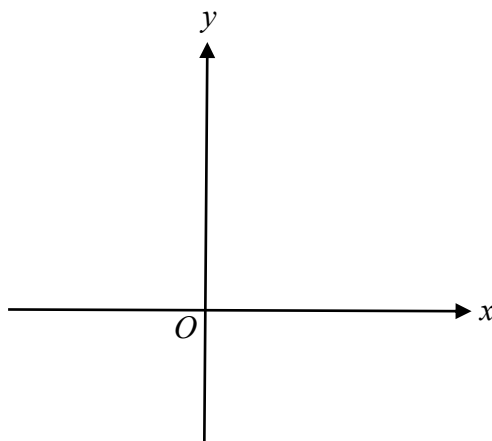
Jawapan / Answer :

(a) (i)

(ii)

(iii)

(b)



- 6 Jadual 4 menunjukkan pencapaian dua orang murid dalam 5 ujian Matematik. Guru Matematik mereka ingin memilih salah seorang daripada mereka untuk mewakili kelas dalam satu Kuiz Matematik peringkat sekolah.

Table 4 shows the achievements of two students in 5 Mathematics tests. Their Mathematics teacher wants to choose one of them to represent their class in a School Mathematics Quiz.

	Ujian 1 <i>Test 1</i>	Ujian 2 <i>Test 2</i>	Ujian 3 <i>Test 3</i>	Ujian 4 <i>Test 4</i>	Ujian 5 <i>Test 5</i>
Sofia	50	64	70	74	90
Armin	60	64	72	65	74

Jadual 4

Table 4

- (a) Berdasarkan pencapaian Sofia, hitung
Based on Sofia's achievement, calculate

- (i) min markah,
the mean mark,
- (ii) varians.
the variance.

[4 markah]
[4 marks]

- (b) Siapakah yang layak mewakili kelas dalam kuiz tersebut? Justifikasikan pilihan anda berdasarkan sukatan serakan yang sesuai digunakan oleh guru mereka untuk membuat pemilihan itu.

Who deserve to represent their class in the quiz? Justify your choice based on the appropriate measure of dispersion used by their teacher to make the selection.

[5 markah]
[5 marks]

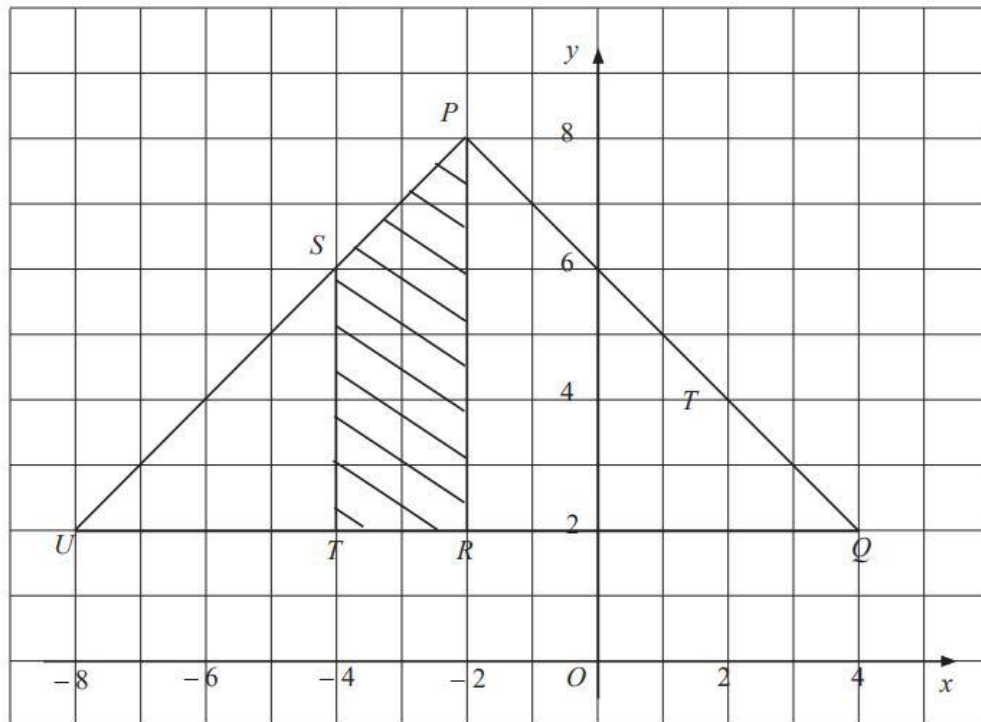
Jawapan / Answer :

(a) (i)

(ii)

(b)

- 7 Rajah 3 menunjukkan tiga segi tiga bersudut tegak PQR , PRU dan STU dilukis pada suatu satah Cartes.
- Diagram 3 shows three right angled triangles PQR , PRU and STU drawn on a Cartesian plane.*



Rajah 3
Diagram 3

- (a) Segitiga STU ialah imej bagi segitiga PQR di bawah gabungan penjelmaan MN . Huraikan selengkapnya penjelmaan:

Triangle STU is the image of triangle PQR under a combined transformation MN . Describe in full, the transformation:

- (i) N
(ii) M

[5 markah]
[5 marks]

- (b) Diberi segitiga PQR mewakili suatu kawasan yang mempunyai luas 28m^2 . Hitung luas dalam, m^2 , kawasan yang berlorek.

It is given that PQR represents a region with an area of 28m^2 . Calculate the area, in m^2 , of the shaded region.

[3 markah]
[3 marks]

Jawapan / *Answer* :

(a)(i)

(ii)

(b)

Bahagian C
Section C

- 16 Hari Guru diraikan pada 16 Mei setiap tahun. Lembaga Pengawas SMK Wira bercadang untuk membeli hadiah kepada semua guru di sekolah itu dengan menggunakan duit dari sumbangan Persatuan Ibu bapa dan Guru (PIBG) dan sumbangan murid-murid berjumlah RM1 100.

Teachers's Day is celebrated on May 16 every year. Prefect Board of SMK Wira plans to buy presents for all teachers by using money from the donation of Parent-Teacher Association (PTA) dan students which is RM1 100 in total.

- (a) Jika pihak PIBG menyumbang 75% dari jumlah sumbangan itu,
If PTA donates 75% from the total donation,
- (i) nyatakan nisbah sumbangan PIBG kepada sumbangan murid-murid,
State the ratio of PTA's donation to the students' donation,
- (ii) hitung, dalam RM, sumbangan murid-murid.
calculate, in RM, the students' donation.

[3 markah]

[3 marks]

- (b) Hasil daripada tinjauan Lembaga Pengawas, mereka menyenarai pendek dua pilihan hadiah. Jadual 8 menunjukkan pilihan-pilihan tersebut.

From the survey done by the Prefect Board, they have shortlisted two choices of presents. Table 8 shows the choices.

Pilihan Choice	Harga hadiah bagi setiap guru lelaki (RM) <i>Price of present for each male teacher (RM)</i>	Harga hadiah bagi setiap guru perempuan (RM) <i>Price of present for each female teacher (RM)</i>
Pertama <i>First</i>	16	20
Kedua <i>Second</i>	18	18

Jadual 8

Table 8

- (i) Pilihan pertama akan menggunakan keseluruhan sumbangan itu manakala pilihan kedua akan berbaki RM38 daripada jumlah sumbangan.
Jika terdapat x bilangan guru lelaki dan y bilangan guru perempuan di sekolah itu, dengan menggunakan kaedah matriks, hitung nilai x dan nilai y .

The first choice will be using all the money from the donation while the second choice will have a balance of RM38 from the total donation.

If there are x number of male teachers and y number of female teachers in that school, by using matrix method, calculate the value of x and of y .

[5 markah]

[5 marks]

- (ii) Lembaga Pengawas bercadang memohon sumbangan daripada Kedai Buku Sekolah untuk membeli kotak bungkusan hadiah-hadiah tersebut. Harga satu kotak bungkusan hadiah bagi pilihan pertama dan kedua masing-masing berharga RM 3 dan RM4. Ketua Pengawas menyatakan bahawa pilihan pertama lebih menjimatkan berbanding pilihan kedua setelah kos kotak bungkusan hadiah diambil kira. Dengan menggunakan jawapan di 17(b)(i), adakah anda bersetuju dengan pernyataan itu?

Justifikasikan jawapan anda.

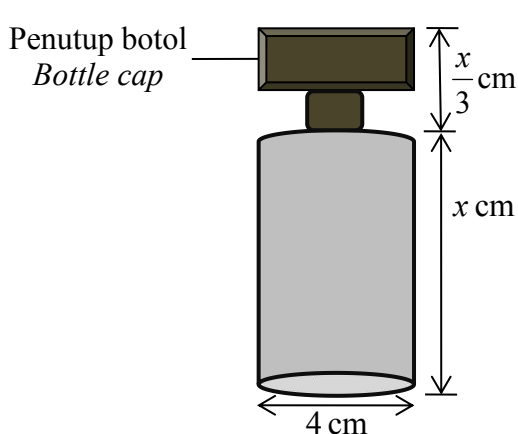
The Prefect Board is planning to ask the donation from the School Book Store to buy the gift boxes for the presents. The prices of a gift box for the present of the first choice and second choice are RM3 and RM4 respectively. The Head Prefect mentions that the first choice will cost less than the second choice after the cost of the gift boxes is taken into account. By using the answer in 17(b)(i), do you agree with that statement? Justify your answer.

[4 markah]

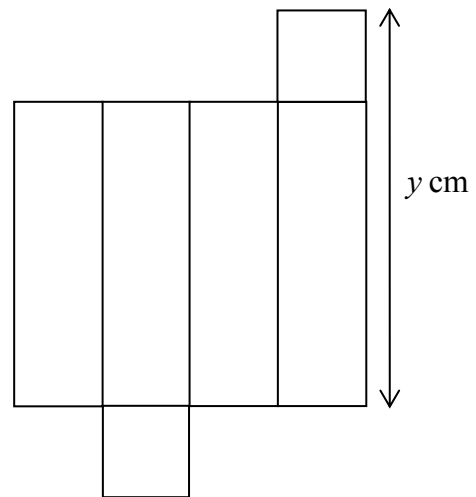
[4 marks]

- (c) Seorang guru bermurah hati menyumbang beberapa botol minyak wangi yang akan menjadi sebahagian daripada hadiah cabutan bertuah pada hari sambutan tersebut. Rajah 9.1 menunjukkan botol minyak wangi itu yang berbentuk silinder dengan isi padu 100 cm^3 . Lembaga Pengawas ingin memasukkan botol minyak wangi itu ke dalam sebuah kotak istimewa berbentuk kuboid. Rajah 9.2 menunjukkan bentangan kotak itu.

A generous teacher donates a few bottles of perfume that will be part of the lucky draw prizes on the day of the celebration. Diagram 9.1 shows the cylindrical perfume bottle with the volume of 100 cm^3 . The Prefect Board wants to put the perfume bottle in a special cuboid-shape box. Diagram 9.2 shows the net of the box.



Rajah 9.1
Diagram 9.1



Rajah 9.2
Diagram 9.2

Cari nilai minimum y jika botol minyak wangi dapat dimuatkan dalam kotak itu.

Find the minimum value of y if the perfume bottle is perfectly fitted inside that box.

[3 markah]

[3 marks]

Jawapan / *Answer* :

(a) (i)

(ii)

(b) (i)

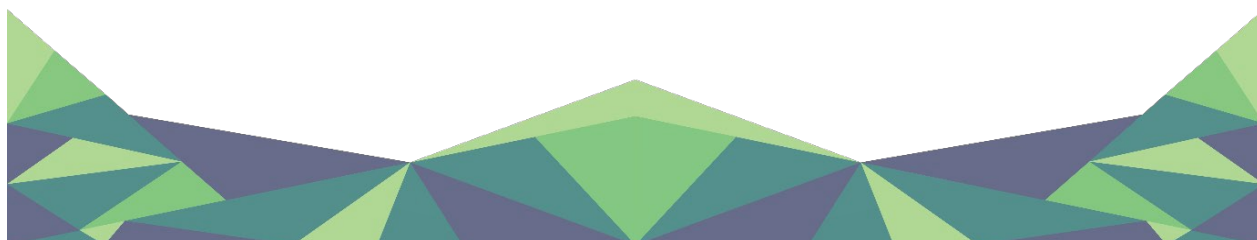
(ii)

(c)

**SIJIL PELAJARAN MALAYSIA
MULAI TAHUN 2021**

**MATEMATIK
(1449)**

SENARAI RUMUS



RUMUS MATEMATIK
MATHEMATICAL FORMULAE

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

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

NOMBOR DAN OPERASI
NUMBERS AND OPERATIONS

- | | |
|---|---|
| 1 $a^m \times a^n = a^{m+n}$ | 2 $a^m \div a^n = a^{m-n}$ |
| 3 $(a^m)^n = a^{mn}$ | 4 $a^{\frac{m}{n}} = (a^{\frac{1}{n}})^m$ |
| 5 Faedah mudah / <i>Simple interest</i> , $I = Prt$ | |
| 6 Faedah kompaun / <i>Compound interest</i> , $MV = P\left(1 + \frac{r}{n}\right)^n$ | |
| 7 Jumlah bayaran balik / <i>Total repayment</i> , $A = P + Prt$ | |

PERKAITAN DAN ALGEBRA
RELATIONSHIP AND ALGEBRA

- | | |
|---|--|
| 1 | Jarak / <i>Distance</i> $= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ |
| 2 | Titik tengah / <i>Midpoint</i> , $(x, y) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ |
| 3 | Laju purata $= \frac{\text{Jumlah jarak}}{\text{Jumlah masa}}$

$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}}$ |
| 4 | $m = \frac{y_2 - y_1}{x_2 - x_1}$ |
| 5 | $m = -\frac{\text{pintasan} - y}{\text{pintasan} - x}$

$m = -\frac{y - \text{intercept}}{x - \text{intercept}}$ |
| 6 | $A^{-1} = \frac{1}{ad - bc} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$ |

SUKATAN DAN GEOMETRI
MEASUREMENT AND GEOMETRY

- 1 Teorem Pythagoras / *Pythagoras Theorem*, $c^2 = a^2 + b^2$
- 2 Hasil tambah sudut pedalaman poligon / *Sum of interior angles of a polygon*
 $= (n - 2) \times 180^\circ$
- 3 Lilitan bulatan = $\pi d = 2 \pi r$
Circumference of circle = $\pi d = 2 \pi r$
- 4 Luas bulatan = πr^2
Area of circle = πr^2
- 5 $\frac{\text{Panjang lengkok}}{2\pi r} = \frac{\theta}{360^\circ}$
 $\frac{\text{Arc length}}{2\pi r} = \frac{\theta}{360^\circ}$
- 6 $\frac{\text{Luas sektor}}{\pi r^2} = \frac{\theta}{360^\circ}$
 $\frac{\text{Area of sector}}{\pi r^2} = \frac{\theta}{360^\circ}$
- 7 Luas layang = $\frac{1}{2} \times$ hasil darab panjang dua pepenjuru
Area of kite = $\frac{1}{2} \times \text{product of two diagonals}$
- 8 Luas trapezium = $\frac{1}{2} \times$ hasil tambah dua sisi selari $\times$ tinggi
Area of trapezium = $\frac{1}{2} \times \text{sum of two parallel sides} \times \text{height}$
- 9 Luas permukaan silinder = $2 \pi r^2 + 2 \pi rh$
Surface area of cylinder = $2 \pi r^2 + 2 \pi rh$
- 10 Luas permukaan kon = $\pi r^2 + \pi rs$
Surface area of cone = $\pi r^2 + \pi rs$
- 11 Luas permukaan sfera = $4 \pi r^2$
Surface area of sphere = $4 \pi r^2$
- 12 Isi padu prisma = luas keratan rentas $\times$ tinggi
Volume of prism = *area of cross section* $\times$ *height*
- 13 Isi padu silinder = $\pi r^2 h$
Volume of cylinder = $\pi r^2 h$

- 14 Isi padu kon = $\frac{1}{3} \pi r^2 h$
Volume of cone = $\frac{1}{3} \pi r^2 h$
- 15 Isi padu sfera = $\frac{4}{3} \pi r^3$
Volume of sphere = $\frac{4}{3} \pi r^3$
- 16 Isi padu piramid = $\frac{1}{3} \times \text{luas tapak} \times \text{tinggi}$
Volume of pyramid = $\frac{1}{3} \times \text{base area} \times \text{height}$
- 17 Scale factor, $k = \frac{PA'}{PA}$
Faktor skala, k = $\frac{PA'}{PA}$
- 18 Area of image = $k^2 \times \text{area of object}$
Luas imej = $k^2 \times \text{luas objek}$

STATISTIK DAN KEBARANGKALIAN
STATISTICS AND PROBABILITY

- 1 Min / Mean, $\bar{x} = \frac{\sum x}{N}$
- 2 Min / Mean, $\bar{x} = \frac{\sum fx}{f}$
- 3 Varians / Variance, $\sigma^2 = \frac{\sum (x - \bar{x})^2}{N} = \frac{\sum x^2}{N} - \bar{x}^2$
- 4 Varians / Variance, $\sigma^2 = \frac{\sum f(x - \bar{x})^2}{\sum f} = \frac{\sum fx^2}{\sum f} - \bar{x}^2$
- 5 Sisihan piawai / Standard deviation, $\sigma = \sqrt{\frac{\sum (x - \bar{x})^2}{N}} = \sqrt{\frac{\sum x^2}{N} - \bar{x}^2}$
- 6 Sisihan piawai / Standard deviation, $\sigma = \sqrt{\frac{\sum f(x - \bar{x})^2}{\sum f}} = \sqrt{\frac{\sum fx^2}{\sum f} - \bar{x}^2}$
- 7 $P(A) = \frac{n(A)}{n(S)}$
- 8 $P(A') = 1 - P(A)$

TAMAT