

Answer **all** questions.

Jawab **semua** soalan.

For  
Examiner's  
Use

- 1 Table 1 shows the three equations of straight line,  $AB$ ,  $CD$  and  $EF$ .  
Jadual 1 menunjukkan tiga persamaan garis lurus,  $AB$ ,  $CD$  dan  $EF$ .

Straight line <i>Garis lurus</i>	Equation of a straight line <i>Persamaan garis lurus</i>
$AB$	$3x - 4y = 7$
$CD$	$y = \frac{3}{4}x - 18$
$EF$	$3x - 2y - 17 = 0$

Table 1  
Jadual 1

- (a) Which straight line did not intersect to each other?  
*Garis lurus manakah yang tidak akan bersilang antara satu sama lain?*

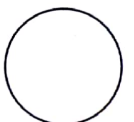
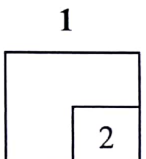
- (b) Give your reason.  
*Beri hujah anda.*

[2 marks]  
[2 markah]

Answer / Jawapan :

(a)

(b)



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2

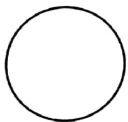
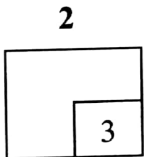
It is given that the variable  $x$  and  $y$  are related by the equation  $x - py = qxy$ , where  $p$  and  $q$  are constants. If vertical axis represents by  $\frac{1}{y}$ , explain how  $p$  and  $q$  could be determined.

*Diberi bahawa pemboleh ubah  $x$  dan  $y$  dihubungkan oleh persamaan  $x - py = qxy$ , dengan keadaan  $p$  dan  $q$  adalah pemalar. Jika paksi mencancang diwakili oleh  $\frac{1}{y}$ , terangkan bagaimana  $p$  dan  $q$  dapat diperolehi.*

[3 marks]

[3 markah]

Answer / Jawapan :



3

$$P = \{-2, -1, 0, 1, 2\}$$

$$Q = \{0, 1, 2\}$$

For  
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Use

Based on the above information, the relation between  $P$  and  $Q$  is defined by the set of ordered pairs  $\{(-2, 2), (-1, 1), (0, 0), (1, 1), (2, 2)\}$ .

Berdasarkan maklumat di atas, hubungan di antara  $P$  dan  $Q$  dinyatakan oleh set pasangan bertertib  $\{(-2, 2), (-1, 1), (0, 0), (1, 1), (2, 2)\}$ .

- (a) State the type of relation between set  $P$  and set  $Q$ .  
*Nyatakan jenis hubungan di antara set  $P$  dan set  $Q$ .*
- (b) Using the function notation, write a relation between set  $P$  and set  $Q$ .  
*Menggunakan tata tanda fungsi, tulis hubungan di antara set  $P$  dan set  $Q$ .*

[2 marks]

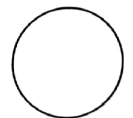
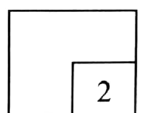
[2 markah]

Answer / Jawapan :

(a)

(b)

3



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4

Diagram 1 shows the function  $f: x \rightarrow |2x+1|$ .

Rajah 1 menunjukkan fungsi  $f: x \rightarrow |2x+1|$ .

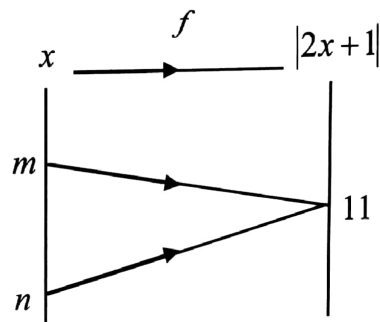


Diagram 1

Rajah 1

Find the value of  $m$  and of  $n$ , such that  $m > n$ .

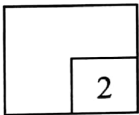
[2 marks]

Cari nilai  $m$  dan nilai  $n$ , dengan keadaan  $m > n$ .

[2 markah]

Answer / Jawapan :

4



5

Given that  $3 = 2^y$  and  $8 = 3^x$ , find the value of  $xy$ .

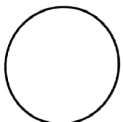
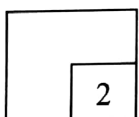
[2 marks]

Diberi  $3 = 2^y$  dan  $8 = 3^x$ , cari nilai  $xy$ .

[2 markah]

Answer / Jawapan :

5



- 6 The population of people in Kuala Langat, Selangor at 1<sup>st</sup> January 2000 was 204 255. The population is expected to increase at an annual rate 1%. After  $t$  years, the equation of population is given by  $P = 204\,255(1.01)^t$ .

*Populasi penduduk daerah Kuala Langat, Selangor pada 1 Januari 2000 ialah 204 255. Populasi dijangka meningkat dengan kadar tahunan 1%. Selepas  $t$  tahun, persamaan populasi diberikan sebagai  $P = 204\,255(1.01)^t$ .*

Find

*Cari*

- (a) the population at 1 January 2010,  
*populasi pada 1 Januari 2010,*
- (b) the year, when the population more than 251 000.  
*tahun, apabila populasi melebihi 251 000.*

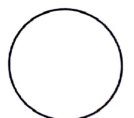
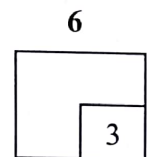
[3 marks]

[3 markah]

Answer / *Jawapan* :

(a)

(b)



For  
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Use

- 7 Diagram 2 shows the seating locations of the vans with the seat number attached to each chair.  
Rajah 2 menunjukkan kedudukan kerusi dalam sebuah van dengan setiap kerusi diletakkan dengan nombor.

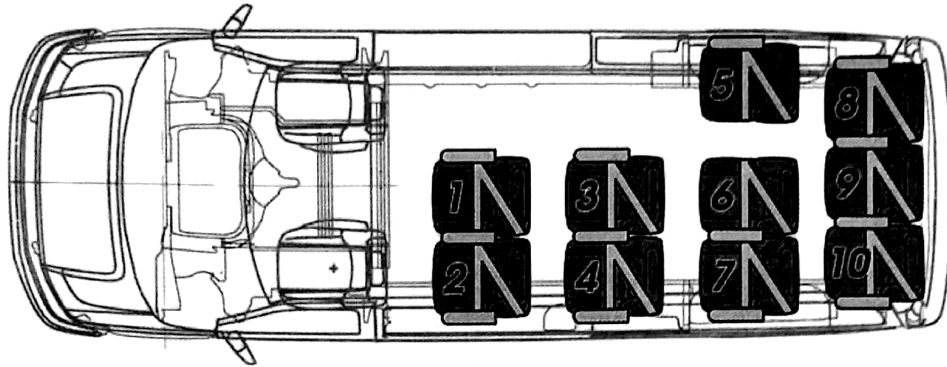


Diagram 2  
Rajah 2

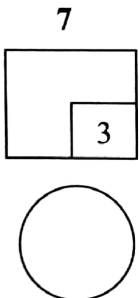
Find the number of seating arrangement if  
Cari bilangan cara susunan kerusi jika

- (a) there are 8 passengers,  
terdapat 8 orang penumpang,
- (b) there are 10 passengers which include a couple of husband and wife who are to sit on chair number 3 and number 4.  
terdapat 10 orang penumpang termasuk sepasang suami isteri yang duduk pada kerusi nombor 3 dan nombor 4.

[3 marks]  
[3 markah]

Answer / Jawapan :

- (a)
- (b)



- 8 The probability of Team A and Team B qualify to the final of Malaysia Cup 2018 are  $\frac{1}{3}$  and  $\frac{2}{5}$  respectively. Find the probability if

For  
Examiner's  
Use

*Kebarangkalian Pasukan A dan Pasukan B layak ke perlawanan akhir Piala Malaysia 2018 adalah masing-masing  $\frac{1}{3}$  dan  $\frac{2}{5}$ . Cari kebarangkalian jika*

- (a) both teams are qualified,  
*kedua-dua pasukan layak,*
- (b) at least one team is qualified.  
*sekurang-kurangnya satu pasukan layak.*

[3 marks]

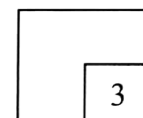
[3 markah]

Answer / Jawapan :

(a)

(b)

8



- 9 Solve the equation  $4 \sin x + 4 \cos x = \frac{1}{\cos x - \sin x}$  for  $0^\circ \leq x \leq 360^\circ$ .

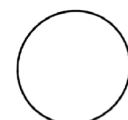
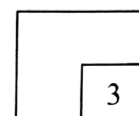
*Selesaikan persamaan  $4 \sin x + 4 \cos x = \frac{1}{\cos x - \sin x}$  bagi  $0^\circ \leq x \leq 360^\circ$ .*

[3 marks]

[3 markah]

Answer / Jawapan :

9



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For  
Examiner's  
Use

10

Given  $\cos \theta = -p$  and  $180^\circ \leq \theta \leq 360^\circ$ . Express the value of  $\sin \frac{\theta}{2}$  in terms of  $p$ .

Diberi  $\cos \theta = -p$  dan  $180^\circ \leq \theta \leq 360^\circ$ . Ungkapkan nilai  $\sin \frac{\theta}{2}$  dalam sebutan  $p$ .

[3 marks]

[3 markah]

Answer / Jawapan :

10



11

The points  $P$ ,  $Q$  and  $R$  are collinear. It is given that  $\overrightarrow{QP} = -3\mathbf{a} + 2\mathbf{b}$  and  $\overrightarrow{QR} = 9\mathbf{a} - 6\mathbf{b}$ . Express

Titik-titik  $P$ ,  $Q$  dan  $R$  adalah segaris. Diberi bahawa  $\overrightarrow{QP} = -3\mathbf{a} + 2\mathbf{b}$  dan  $\overrightarrow{QR} = 9\mathbf{a} - 6\mathbf{b}$ . Ungkapkan

(a)  $\overrightarrow{PR}$  in terms of  $\mathbf{a}$  and of  $\mathbf{b}$ ,  
 $\overrightarrow{PR}$  dalam sebutan  $\mathbf{a}$  dan  $\mathbf{b}$ ,

(b)  $\overrightarrow{PQ}$  in terms of  $\overrightarrow{PR}$ .  
 $\overrightarrow{PQ}$  dalam sebutan  $\overrightarrow{PR}$ .

[4 marks]

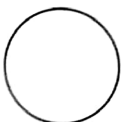
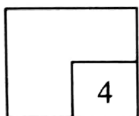
[4 markah]

Answer / Jawapan :

(a)

(b)

11





- 12 The point  $A$  is  $y$ -intercept to the curve  $y = 3x^2 - 12x + 1$ .  
*Titik  $A$  ialah pintasan- $y$  kepada lengkung  $y = 3x^2 - 12x + 1$ .*

Find  
*Cari*

- (a) the gradient of the tangent to the curve at point  $A$ ,  
*kecerunan tangen kepada lengkung itu di titik  $A$ ,*
- (b) the equation of the normal to the curve at point  $A$ .  
*persamaan normal kepada lengkung itu di titik  $A$ .*

[3 marks]  
[3 markah]

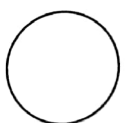
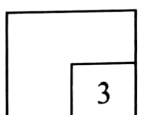
Answer / *Jawapan* :

(a)

(b)

For  
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Use

12



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For  
Examiner's  
Use

13

Diagram 3 shows five rectangular plots with the same size and has been planted with five types of vegetables. Rizal plans to fence all the plots using 68 metre of barbed wire.

Rajah 3 menunjukkan lima petak berbentuk segiempat tepat yang sama saiz dan telah ditanam dengan lima jenis sayuran. Rizal bercadang untuk memagari keseluruhan setiap petak dengan menggunakan 68 meter kawad berduri.

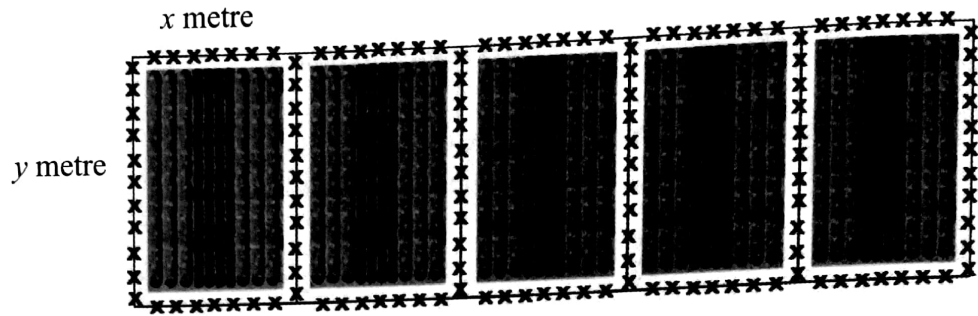


Diagram 3  
Rajah 3

If  $A$  represents the whole area of his orchard, find  
Jika  $A$  mewakili luas bagi keseluruhan kebunnya, cari

(a)  $\frac{dA}{dx}$  in terms of  $x$ ,

$\frac{dA}{dx}$  dalam sebutan  $x$ ,

(b) the maximum area, in  $m^2$ , of each plot.  
luas maksimum, dalam  $m^2$ , bagi setiap petak.

[4 marks]

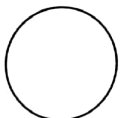
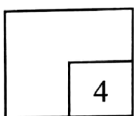
[4 markah]

Answer / Jawapan :

(a)

(b)

13



- 14 It is given  $f(x) = mg(x) + 3$  and  $f'(x) = 2m$ , where  $m$  is a constant.  
Diberi  $f(x) = mg(x) + 3$  dan  $f'(x) = 2m$ , dengan keadaan  $m$  ialah pemalar.

For  
Examiner's  
Use

Find  
Cari

(a)  $g(x)$ ,

(b) the value of  $m$  if  $\int_0^1 f(x) dx = 10$ .

nilai  $m$  jika  $\int_0^1 f(x) dx = 10$ .

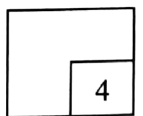
[4 marks]  
[4 markah]

Answer / Jawapan :

(a)

(b)

14



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For  
Examiner's  
Use

- 15 Ahmad invest of RM  $p$  in a business. His investment increases at a rate of  $\frac{dp}{dt} = 2t + 242$ , where  $t$  is the time in year. Given the initial investment is RM2 000.

Find the number of years so that its investment becomes twice of the initial investment.

*Ahmad melabur sebanyak RM  $p$  dalam suatu perniagaan. Pelaburannya bertambah pada kadar  $\frac{dp}{dt} = 2t + 242$ , dengan keadaan  $t$  ialah masa dalam tahun. Diberi pelaburan asal sebanyak RM2 000. Cari bilangan tahun supaya pelaburannya menjadi dua kali ganda daripada pelaburan asal.*

[3 marks]

[3 markah]

Answer / Jawapan :

15



- 16 If the roots of the quadratic equation  $x^2 + qx + r = 0$  are  $\alpha$  and  $\alpha + 2$ , express  $r$  in terms of  $q$ .

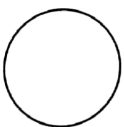
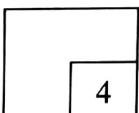
*Jika punca-punca bagi persamaan  $x^2 + qx + r = 0$  ialah  $\alpha$  dan  $\alpha + 2$ , ungkapkan  $r$  dalam sebutan  $q$ .*

[4 marks]

[4 markah]

Answer / Jawapan :

16



- 17 Diagram 4 shows the graph of the quadratic function  $f(x) = ax^2 + bx + c$ .  
*Rajah 4 menunjukkan graf fungsi kuadratik  $f(x) = ax^2 + bx + c$ .*

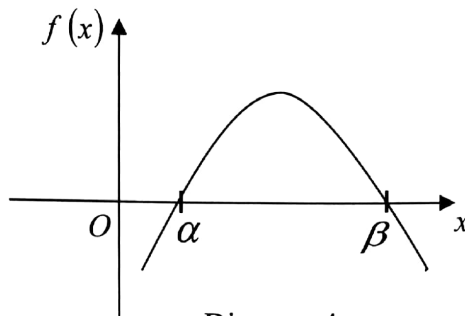


Diagram 4  
*Rajah 4*

State  
*Nyatakan*

- (a) the type of roots,  
*jenis-jenis punca,*
- (b) the range of values of  $x$  when  $f(x) < 0$ ,  
*julat bagi nilai  $x$  apabila  $f(x) < 0$ ,*
- (c) the range which is **not possible** for values of  $a$ .  
*julat yang **tidak mungkin** bagi nilai  $a$ .*

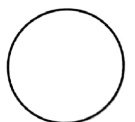
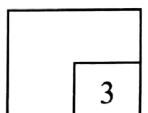
[3 marks]  
 [3 markah]

Answer / *Jawapan* :

- (a)
- (b)
- (c)

For  
 Examiner's  
 Use

17



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For  
Examiner's  
Use

18

Diagram 5 shows a graph of curve  $y = |(x - p)^2 + q - 1|$  with the turning point  $(3, 6)$ . Points  $M$  and  $N$  lie on the  $x$ -axis.

Rajah 5 menunjukkan graf bagi lengkung  $y = |(x - p)^2 + q - 1|$  dengan titik pusingan  $(3, 6)$ . Titik-titik  $M$  dan  $N$  terletak pada paksi- $x$ .

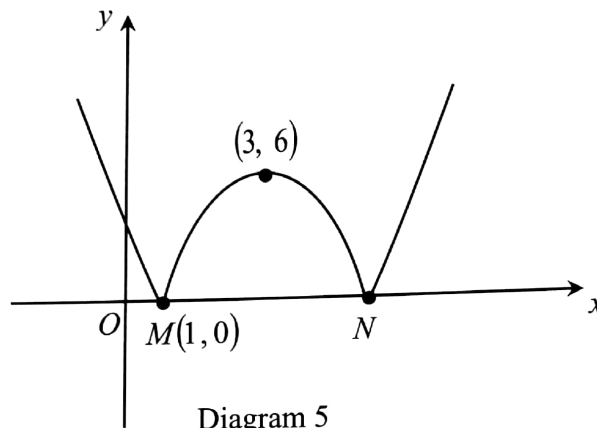


Diagram 5  
Rajah 5

Find

Cari

- (a) the coordinates of  $N$ ,  
koordinat  $N$ ,
- (b) the value of  $p$  and of  $q$ ,  
nilai  $p$  dan nilai  $q$ ,
- (c) the turning point of a graph of curve  $y = (x - p)^2 + q - 1$ .  
titik pusingan graf bagi lengkung  $y = (x - p)^2 + q - 1$ .

[4 marks]

[4 markah]

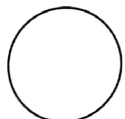
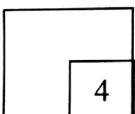
Answer / Jawapan :

(a)

(b)

(c)

18



- 19 Table 2 shows the number of words typed per minute by 40 candidates in a typing test. *Jadual 2 menunjukkan bilangan perkataan yang ditaip seminit oleh 40 orang calon dalam satu ujian menaip.*

For  
Examiner's  
Use

Number of words per minute <i>Bilangan patah perkataan seminit</i>	Number of candidates <i>Bilangan calon</i>
35 – 44	3
45 – 54	8
55 – 64	13
65 – 74	12
75 – 84	3
85 – 94	1

Table 2  
*Jadual 2*

- (a) Find the range of the number of words per minute.  
*Cari julat bilangan patah perkataan seminit.*
- (b) It is found that 50% of the candidates passed the typing test.  
Mei Ling managed to type 60 words per minute.  
Does she pass the test? Give your reason.  
*Didapati bahawa 50% daripada calon tersebut lulus dalam ujian menaip.  
Mei Ling berjaya menaip 60 patah perkataan seminit.  
Adakah Mei Ling lulus dalam ujian tersebut? Berikan sebab anda.*

[4 marks]

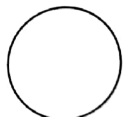
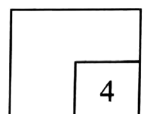
[4 markah]

Answer / *Jawapan* :

(a)

(b)

19



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For  
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Use

20

It is given that vectors  $\overrightarrow{PQ} = (h+3)\underline{i} + 5\underline{j}$  where  $h$  is constant.  
Calculate the values of  $h$  if the magnitude  $\overrightarrow{PQ}$  is 13 units.

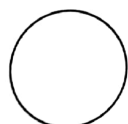
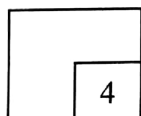
Diberi vektor  $\overrightarrow{PQ} = (h+3)\underline{i} + 5\underline{j}$  dengan keadaan  $h$  adalah pemalar.  
Hitung nilai-nilai  $h$  jika magnitud bagi vektor  $\overrightarrow{PQ}$  adalah 13 unit.

[4 marks]

[4 markah]

Answer / Jawapan :

20





- 21 Diagram 6 shows a semicircle with centre  $O$  and radius  $r$  cm.  
 Given that the length of the arc  $ABC = 15\pi$  cm and  $\angle AOB = 2.5$  radian.  
*Rajah 6 menunjukkan sebuah semibulatan dengan pusat  $O$  dan jejari  $r$  cm.  
 Panjang lengkok  $ABC = 15\pi$  cm dan  $\angle AOB = 2.5$  radian.*

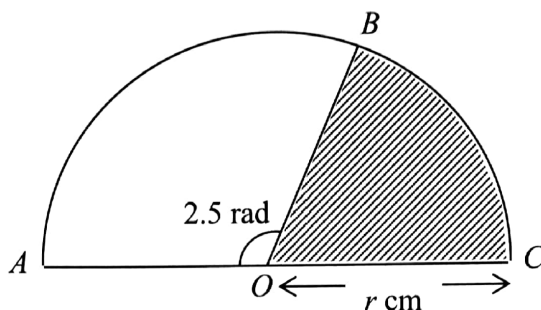


Diagram 6  
*Rajah 6*

Calculate the area, in  $\text{cm}^2$ , of the shaded region.

*Hitung luas, dalam  $\text{cm}^2$ , rantau berlorek.*

[ Use / Guna  $\pi = 3.142$  ]

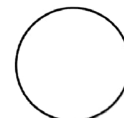
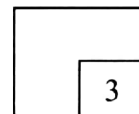
[3 marks]

[3 markah]

Answer / Jawapan :

For  
 Examiner's  
 Use

21



[Lihat halaman sebelah  
 SULIT

For  
Examiner's  
Use

22

It is given that the sum of the first  $n$  terms of an arithmetic progression is

$$S_n = 2n^2 - 7n. \text{ Find}$$

*Diberi bahawa hasil tambah  $n$  sebutan pertama bagi suatu jantang aritmetik ialah*

$$S_n = 2n^2 - 7n. \text{ Cari}$$

- (a) the first term,  
*sebutan pertama,*
- (b) the common difference.  
*beza sepunya.*

[3 marks]

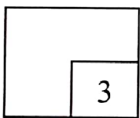
[3 markah]

Answer / Jawapan :

(a)

(b)

22



23

Munir has RM200 in the saving box on 31<sup>st</sup> May 2018. Starting on 1<sup>st</sup> June 2018, Munir added RM4 daily into the box to buy a mobile phone. On 1<sup>st</sup> July 2018, he take-out all the money and went to a town to buy the mobile phone. He uses RM15 for bus tickets, RM30 for lunch and still has RM40. How much the price of the mobile phone?

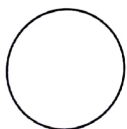
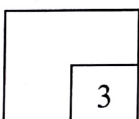
*Pada 31 Mei 2018, Munir mempunyai RM200 di dalam kotak simpanannya. Bermula 1 Jun 2018, Munir menambah RM4 ke dalam kotak tersebut pada setiap hari untuk membeli sebuah telefon bimbit. Pada 1 Julai 2018, dia mengeluarkan semua wang yang dikumpul dan pergi ke bandar untuk membeli telefon bimbit. Dia menggunakan RM15 untuk tiket bas, RM30 untuk makan tengah hari dan masih mempunyai baki RM40. Berapakah harga telefon bimbit tersebut?*

[3 marks]

[3 markah]

Answer / Jawapan :

23



- 24 Given that 4,  $5x$  and 16 are the first three terms of geometric progression.  
*Diberi 4,  $5x$  dan 16 merupakan tiga sebutan pertama bagi suatu jangjang geometri.*

*For  
Examiner's  
Use*

Find  
*Cari*

- (a) the possible values of  $x$ ,  
*nilai-nilai yang mungkin bagi  $x$ ,*
- (b) the sum of the first ten terms if all the terms are positive.  
*hasil tambah sepuluh sebutan pertama jika semua sebutan adalah positif.*

[4 marks]

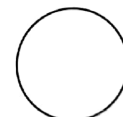
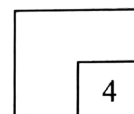
[4 markah]

Answer / *Jawapan* :

(a)

(b)

24



[Lihat halaman sebelah  
SULIT

For  
Examiner's  
Use

25

The mass of apples from an orchard has a normal distribution with a mean of 150 g and a standard deviation of 20 g.

The apples with mass of more than  $(150 + w)$ g are labelled as Grade *L* while the apples with mass of less than  $(150 + w)$ g are labelled as Grade *M*.

*Jisim bagi buah epal dari sebuah dusun adalah mengikut taburan normal dengan min 150 g dan sisihan piawai 20 g.*

*Epal yang mempunyai jisim lebih daripada  $(150 + w)$ g dilabelkan sebagai Gred *L* manakala epal yang mempunyai jisim kurang daripada  $(150 + w)$ g dilabelkan sebagai Gred *M*.*

If 80% of the apples from the orchard are neither Grade *L* nor Grade *M*, find the value of  $w$ .

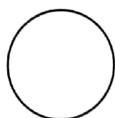
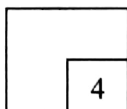
*Jika 80% daripada buah-buah epal dari dusun tersebut bukan Gred *L* mahupun Gred *M*, cari nilai  $w$ .*

[4 marks]

[4 markah]

Answer / Jawapan

25



**END OF QUESTION PAPER**  
**KERTAS PEPERIKSAAN TAMAT**