SEKOLAH MENENGAH KEBANGSAAN INFANT JESUS CONVENT
SEKOLAH BERPRESTASI TINGGI

PEPERIKSAAN PERTENGAHAN TAHUN 2022

MATHEMATICS **1449/1**
TINGKATAN 5
OGOS
1 jam 30 minit **Satu jam tiga puluh minit**

NAMA : .....

KELAS : .....

1 *Kertas soalan ini mengandungi 40 soalan.*

2 *Rumus matematik disediakan di halaman 2, 3 dan 4.*

3 *Sila hitamkan jawapan anda pada kertas jawapan yang diberikan. Sekiranya anda ingin menukar jawapan, padam dan hitamkan jawapan anda yang baharu.*

4 *Penggunaan kalkulator yang tidak diprogramkan adalah dibenarkan.*

Disediakan oleh,	Disemak oleh,	Disahkan oleh,
.....	.....	.....
Erzaqiran Mohd bin M. Salleh Guru Matematik Ting. 5 SMK I.J Convent, Johor Bahru	Wan Nazariah binti Wan Mahmood Ketua Panitia Matematik SMK I.J Convent, Johor Bahru	

Kertas soalan ini mengandungi **21** halaman bercetak .

NOMBOR DAN OPERASI
NUMBER 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 $a^{\frac{1}{n}} = \sqrt[n]{a}$

5 $a^{\frac{m}{n}} = (a^m)^{\frac{1}{n}} = (a^{\frac{1}{n}})^m$

6 $a^{\frac{m}{n}} = \sqrt[n]{a^m} = (\sqrt[n]{a})^m$

7 Faedah mudah / *Simple interest*, $I = Prt$

8 *Nilai matang/ Maturity value*, $M = P\left(1+\frac{r}{n}\right)^{nt}$

9 Jumlah bayaran balik / *Total repayment*, $A = P + Prt$

PERKAITAN DAN ALGEBRA
RELATIONSHIP AND ALGEBRA

1 Jarak / *Distance* = $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

2 Titik Tengah / *midpoint* $(x, y) = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

3 Laju Purata = $\frac{\text{Jumlah jarak}}{\text{Jumlah masa}}$

Average speed = $\frac{Total\ distance}{Total\ time}$

4 $m = \frac{y_2-y_1}{x_2-x_1}$

4 $A^{-1} = \frac{1}{ad-bc}\begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$

5 $m = -\frac{\text{pintasan-}y}{\text{pintasan-}x}$

$m = -\frac{y\text{-}intercept}{x\text{-}intercept}$

SUKATAN DAN GEOMETRI

MEASUREMENT AND GEOMETRY

1 Pythagoras / *Pythagoras Theorem* $c^2 = a^2 + b^2$
Teorem

2 Hasil tambah sudut pedalaman poligon / *Sum of interior angles of a polygon*
$= (n - 2) \times 180^\circ$

3 Lilitan bulatan = $\pi d = 2\pi j$
Circumference of circle = $\pi d = 2\pi r$

4 Luas bulatan = πj^2
Area of circle = πr^2

5 $\frac{\text{Panjang lengkok}}{2j} = \frac{\square}{360^\circ}$
$\frac{\text{Arc length}}{2r} = \frac{\square}{360^\circ}$

6 $\frac{\text{Luas sektor}}{j^2} = \frac{\square}{360^\circ}$
$\frac{\text{Area of sector}}{r^2} = \frac{\square}{360^\circ}$

7 $\text{Luas lelayang} = \frac{1}{2} \times \text{hasil darab panjang dua pepenjuru}$
$\text{Area of kite} = \frac{1}{2} \times \text{product of two diagonals}$

8 Luas trapezium = $\frac{1}{2}$ × hasil tambah dua sisi selari × tinggi
Area of trapezium = $\frac{1}{2} \times \text{sum of parallel sides} \times \text{height}$

9 Luas permukaan silinder = $2\pi j^2 + 2\pi jt$
Surface area of cylinder = $2\pi r^2 + 2\pi rh$

10 Luas permukaan kon = $\pi j^2 + \pi js$
Surface area of cone = $\pi r^2 + \pi rs$

11 Luas permukaan sfera = $4\pi j^2$
Surface area of sphere = $4\pi r^2$

12 Isi padu prisma = luas keratan rentas × tinggi
Volume of prism = cross sectional area × height

13 Isi padu silinder = $\pi j^2 t$

Volume of cylinder = $\pi r^2 h$

14 Isi padu kon = $\frac{1}{3}\pi j^2 t$

Volume of cone = $\frac{1}{3}\pi r^2 h$

15 Isi padu sfera = $\frac{4}{3}\pi j^3$

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 = $\frac{1}{3} \times \textit{base area} \times \textit{height}$

17 Faktor skala, $k = \frac{PA'}{PA}$

Scale factor, $k = \frac{PA'}{PA}$

18 Luas imej = $k^2 \times$ luas objek
Area of image = $k^2 \times$ *area of object*

STATISTIK DAN KEBARANGKALIAN
STATISTICS AND PROBABILITY

1 *Min/ Mean*, $\bar{x} = \frac{x}{N}$

2 *Min/ Mean*, $\bar{x} = \frac{fx}{f}$

3 *Varians/Variance*, $\square^2 = \frac{x^2}{N} - \bar{x}^2 = \frac{(x-\bar{x})^2}{N}$

4 *Varians/Variance*, $\square^2 = \frac{f x^2}{f} - \bar{x}^2 = \frac{f(x-\bar{x})^2}{f}$

5 *Sisihan piawai/Standard deviation*, $= \sqrt{\frac{x^2}{N} - \bar{x}^2} = \sqrt{\frac{(x-\bar{x})^2}{N}}$

6 *Sisihan piawai/Standard deviation*, $= \sqrt{\frac{fx^2}{f} - \bar{x}^2} = \sqrt{\frac{f(x-\bar{x})^2}{f}}$

7 $P(A) = \frac{n(A)}{n(S)}$

8 $P(A') = 1 - P(A)$

Answer **all** questions

1 Express 0.0000432 in standard form.

A 4.32×10^{-5}

B 4.32×10^{5}

C 43.2×10^{-6}

D 43.2×10^{6}

2 $\dfrac{1\cdot08\times10^{2}}{(6\times10^{-2})^{3}}=$

A 3×10^{5}

B 5×10^{5}

C 3×10^{6}

D 5×10^{6}

3. $5.26\times10^{-6}+2.4\times10^{-7}=$

A 5.5×10^{-6}

B 5.5×10^{-7}

C 7.6×10^{-13}

D 7.6×10^{13}

4. In Diagram 4, *GHJKLM* is a regular hexagon and *HJKP* is a quadrilateral.

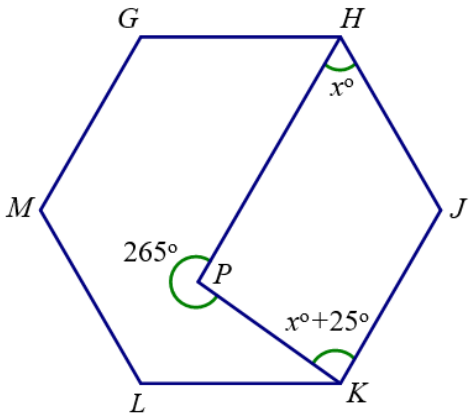


Diagram 4

Calculate the value of *x*.

A 60

B 65

C 80

D 105

5. Express 102_8 as a number in base five.

A 132_5

B 213_5

C 231_5

D 321_5

6. $10111_2 + 11_2 =$

A 10001_2

B 10100_2

C 11010_2

D 11101_2

7. Diagram 7 shows several points on a Cartesian plane.

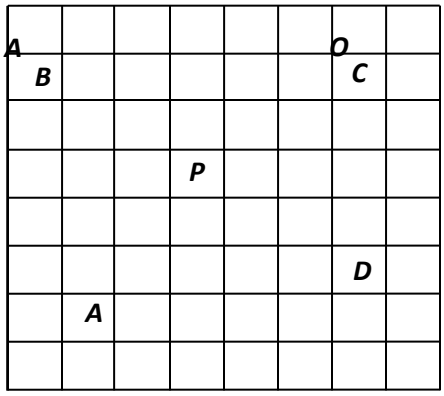


Diagram 7

Which of the points ***A***, ***B***, ***C*** and ***D*** is the image of point P under translation $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$?

8. Diagram 8 shows a triangle *R* drawn on a square grid.

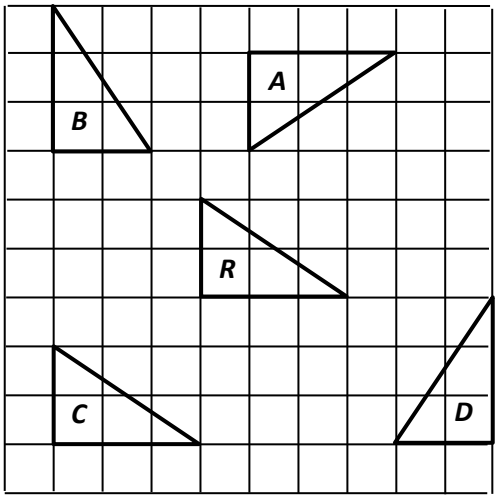


Diagram 8

Among triangles ***A***, ***B***, ***C***, and ***D***, which is the image of triangle *R* under a single reflection?

9. In Diagram 9, *RSW* is a tangent to the circle *TUVS* with centre *O*, at point *S*. *TOS* is a diameter of the circle.

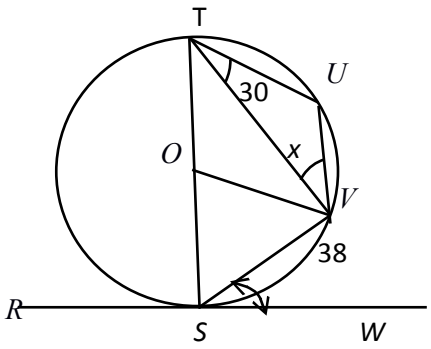


Diagram 9

Find the value of *x*.

A 12

B 22

C 30

D 52

10. In a container there are 330 marbles consisting of red, green and blue marbles. Given that the number of red marbles is 120. If one marble is chosen at random, the probability of a green marble being selected is $\frac{4}{11}$. Calculate the number of blue marbles in the container.

A 90

B 120

C 135

D 210

11. In Diagram 11, QRT is a straight line,

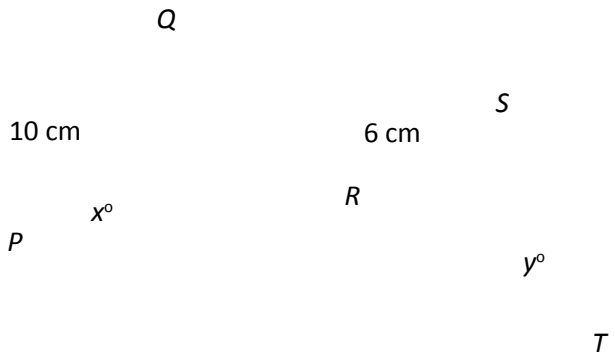


Diagram 11

Given $\cos x^o = \frac{5}{13}$ and $\tan y^o = \frac{3}{4}$. Calculate the length of QR, in cm.

A 10

B 12

C 14

D 24

12. Which of the following situations will **NOT** impose a compulsory deductible on policyholders in motor insurance?

A The vehicle was driven by an individual not named in the policy.

B The vehicle was driven by an individual under the age of 21.

C The vehicle is driven by an individual who is the holder of licence L.

D The vehicle is driven by an individual full driving licence of more than 2 years.

13. Nazim chargeable income in 2021 was RM44 020. He paid zakat amounting to RM500 in that year. Table 13 shows individual income tax rate for chargeable income between RM35 001 and RM50 000.

Chargeable income (RM)	**Calculations (RM)**	**Rate (%)**	**Tax (RM)**
35 001 – 50 000	On the first 35 000		600
	Next 15 000	8	1200

Table 13

Calculate the income tax to be paid by Nazim.

A RM721.60

B RM821.60

C RM1 321.60

D RM1 544.60

14. *Jasmin's* active income is RM4 500. His fixed expenses and variable expenses are RM1 700 and RM2 600 respectively. For this month, his variable expenses has increased by 20%. Calculate *Jasmin's* cash flow this month.

A Positive cash flow of RM200

B Positive cash flow of RM320

C Negative cash flow of RM200

D Negative cash flow of RM320

15. *Syed* deposits RM10 500 in a bank which pays a simple interest rate of x% per annum. The total saving of *Syed* at the end of the fourth year is RM11 676. Calculate the value of *x*.

A 2.8

B 3.0

C 3.5

D 4.0

16. In a vehicle accident incident, Jaafar had made a claim for damage to his vehicle as well as a claim for damage to the vehicle he collided with. State the motor insurance policy that Jaafar may have purchased.

A Act Policy

B Third Party Policy

C Comprehensive Policy

D Third Party Policy, Fire and Theft Policy

17. What type of tax is imposed on stratified properties to replace quit rent?

A Parcel tax

B Property Assessment tax

C Service tax

D Joint ownership tax

18. *Zamani* wants to buy fire insurance for his house. Based on the percentage of co-insurance, the amount of insurance that *Zamani* has to buy is RM420 000. However, *Zamani* only buys fire insurance which amounts to 80% of the value. In one incident, his house caught fire with a total loss of RM50 000. Calculate the compensation he would receive in that case.

A RM10 000

B RM40 000

C RM46 000

D RM62 500

19. State two types of tax rebate allowed by the government.

I. Zakat or fitrah.

II. Dividend.

III. Taxable income is not exceeding RM35 000.

A I & II

B I & III

C II & III

D I, II & III

20. Table 20 shows some values of the variables *x* and *y*.

x	4	*m*
y	8	27

Diagram 20

It is given that y varies directly with the cube of *x*. Calculate the value of *m*.

A 1

B 6

C 8

D 12

21 Given that *P* varies directly as the cube of *S*, inversely as the square of *Q*, and also inversely as the square root of *R*. If the relationship between *P, Q, R* and *S* is represented by the equation $P = kQ^{x}R^{y}S^{z}$ where k is a constant, the values of *x, y* and *z* are,

	x	***y***	***z***
A	-2	$-\frac{1}{2}$	3
B	-3	$-\frac{1}{2}$	-2
C	2	-3	$-\frac{1}{2}$
D	$-\frac{1}{2}$	-2	3

22. Given that $\begin{pmatrix} p & 3 \end{pmatrix}\begin{pmatrix} 2p & 1 \\ -4 & -5 \end{pmatrix} = \begin{pmatrix} 6 & -12 \end{pmatrix}$, find the value of p.

A 1

B 2

C 3

D 4

23. $\frac{1}{4}\begin{pmatrix} 8 & -4 \\ -12 & 16 \end{pmatrix} - \begin{pmatrix} 2 & -2 \\ -4 & 1 \end{pmatrix} + \begin{pmatrix} -1 & 2 \\ -3 & -7 \end{pmatrix} =$

A $\begin{pmatrix} -1 & 3 \\ -2 & 4 \end{pmatrix}$

B $\begin{pmatrix} -1 & 3 \\ 2 & -4 \end{pmatrix}$

C $\begin{pmatrix} -1 & 0 \\ -2 & -4 \end{pmatrix}$

D $\begin{pmatrix} -1 & 3 \\ -2 & -4 \end{pmatrix}$

24. Express $\frac{a+2}{b} - \frac{a-3}{ab}$ as a single fraction in its simplest form.

A $\frac{a^2-3}{ab}$

B $\frac{a^2+3}{ab}$

C $\frac{a^2+a-3}{ab}$

D $\frac{a^2+a+3}{ab}$

25. Given that $p=\frac{1}{2}+\frac{q}{3}$, express q in terms of p.

A $q=\frac{p-3}{2}$

B $q=\frac{3-p}{2}$

C $q=\frac{3-6p}{2}$

D $q=\frac{6p-3}{2}$

26. Diagram 26 shows two triangles, *M* and *N*.

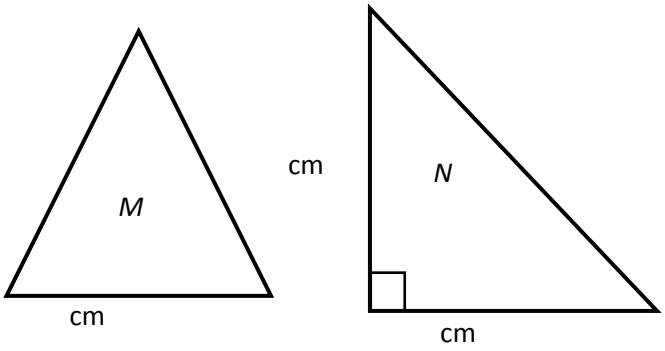


Diagram 26

Given that the height of triangle *M* is 8 cm. The area of triangle *M* and triangle *N* is the same. Find the value of *p*.

A 8 cm

B 7 cm

C 6 cm

D 5 cm

27. *Simplify* : $\left[\frac{27m^3}{n^6}\right]^{\frac{1}{3}} \div m^2n^3$

A $\frac{3}{mn^5}$

B $\frac{3}{mn^3}$

C $\frac{3m^5}{n^5}$

D $\frac{3m^3}{n^3}$

28. List all the subsets of set $Y = \{1, 8\}$.

A $\{1\}, \{8\}$

B $\{1\}, \{8\}, \{\ \}$

C $\{1\}, \{8\}, \{1, 8\}$

D $\{1\}, \{8\}, \{1, 8\}, \{\ \}$

29. List all integers x that satisfy both inequalities $\frac{2x-3}{5} < 3$ and $-5x + 6 \leq 1$

A 1, 2, 3, 4, 5, 6, 7, 8

B 1, 2, 3, 4, 5, 6, 7, 8, 9

C 2, 3, 4, 5, 6, 7, 8

D 2, 3, 4, 5, 6, 7, 8, 9

30. $(3 + 2x)^2 - 4x(x - y) =$

A $9 + 12x + 4xy$

B $9 - 12x + 4xy$

C $9 + 12x - 4xy$

D $9 - 12x - 4xy$

31. Diagram 31 shows a graph that has loops and multiple edges.

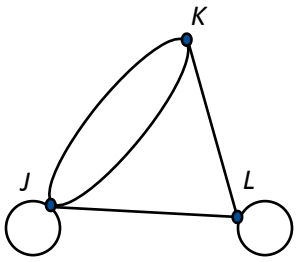


Diagram 31

Which of the following is the set of edges for the graph?

A $\{(J,J),(J,K),(K,L),(J,L),(L,L)\}$

B $\{(J,J),(J,K),(J,K),(K,L),(J,L),(L,L)\}$

C $\{(J,J),(J,K),(K,L),(K,L),(J,L)\}$

D $\{(J,J),(L,L),(J,L),(J,L),(K,L),(J,K)\}$

32. *Diagram* 32 *shows an undirected and weighted graph. The weight represents the distance, in* km.

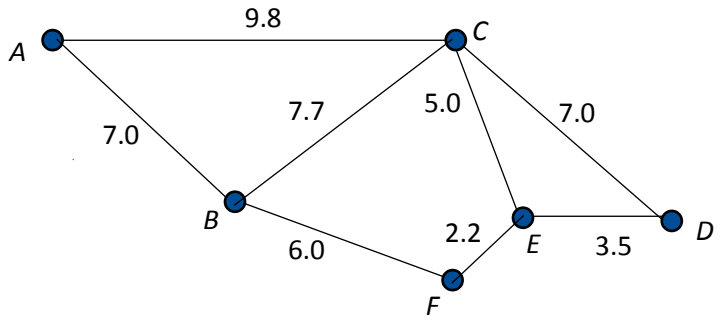


Diagram 32

Calculate the difference between the longest and shortest distance, in meters from point *A* to point *E*.

A 10 900

B 10 400

C 5 500

D 4 900

33. Diagram 33 is a pictograph showing the number of tourists who visited *Pangkor Island* in March and April. The number of visitors in January and February are not shown.

January	
February	
March	☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺
April	

☺ represents 2500 tourists

Diagram 33

A total of 55 000 tourists had visited *Pangkor Island* in those four months. The number of tourists in January was two third the number of tourists in February. The number of tourists in February was

A 5 000

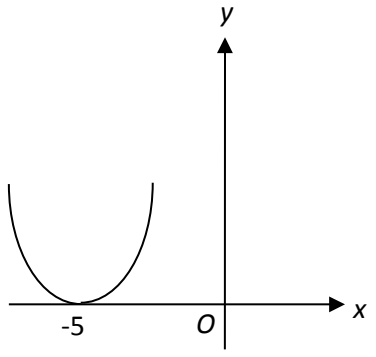
B 10 000

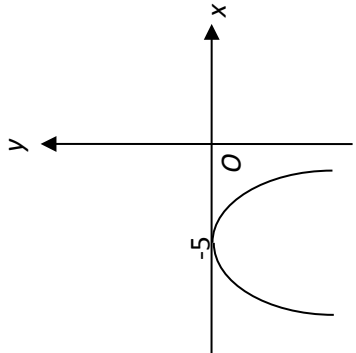
C 15 000

D 20 000

34. Which of the following graphs represents the graph of $y=2x^2-5$?

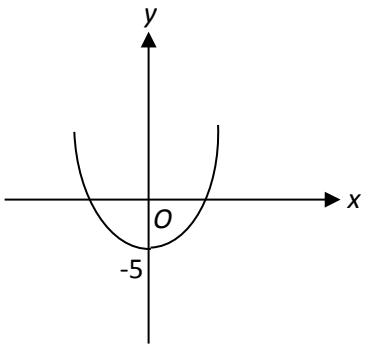
A



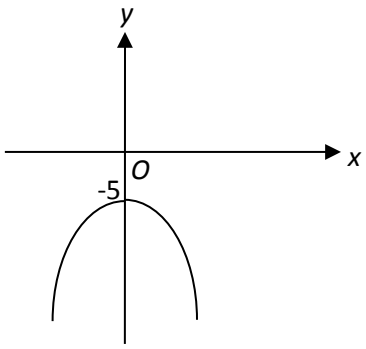


B

C



D



35. Diagram 35 shows a graph function of $y = 2(x + 2)(x – 2)$.

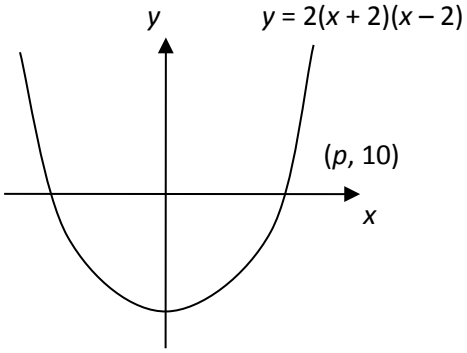


Diagram 35

Find the value of p.

A 2

B 3

C 4

D 5

36. Table 36 shows a set of six pieces of data where x and y are integers.

3,	5,	x,	y,	4,	5

Table 36

The mean for the data is 4 and the median is 4. Two new pieces of data, 4 and 6 were put into the set. Determine the mode for these eight pieces of data.

A 2

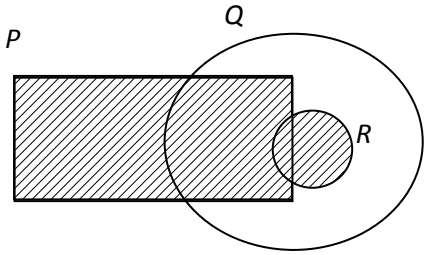
B 3

C 4

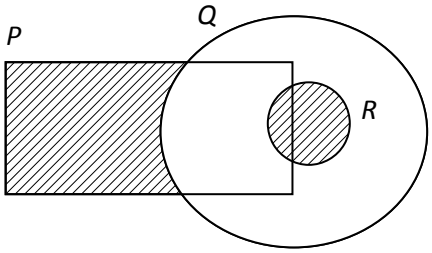
D 5

37. Which of the following shaded region in the Venn diagrams represent the set $P \cup (Q \cap R)$?

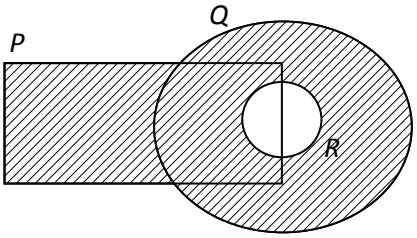
A



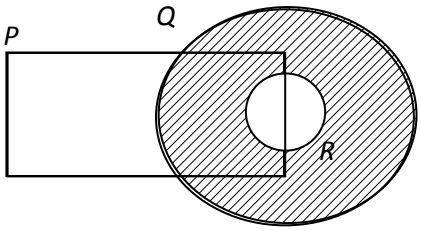
B



C

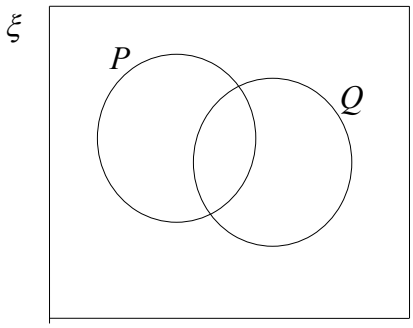


D



38. Diagram 38 is a Venn Diagram showing the universal set ξ, set P and set Q.

The region $(P \cup Q')'$ is equivalent to the region



Rajah / *Diagram* 38

A $P' \cup Q$

B $P \cap Q'$

C $P' \cap Q$

D $P \cup Q'$

39. Given that set $P = \{1, 2, 3, 4\}$, find the number of subsets of P.

A 4

B 6

C 8

D 16

40. What is the value of service tax per year for each credit card owned?

A 10

B 25

C 50

D 105

END OF QUESTION PAPER