

**SULIT**  
**1449/1**  
**Matematik**  
**Kertas 1**  
**Ogos**  
**2007**  
 $1\frac{1}{4}$  jam

**1449/1**



**SEKTOR SEKOLAH BERASRAMA PENUH**  
**BAHAGIAN SEKOLAH**  
**KEMENTERIAN PELAJARAN MALAYSIA**

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**PEPERIKSAAN PERCUBAAN SELARAS SBP**  
**SIJIL PELAJARAN MALAYSIA**

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**MATEMATIK**

Kertas 1

Satu jam lima belas minit

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**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

1. Kertas soalan ini adalah dalam Bahasa Inggeris.
2. Calon dikehendaki membaca maklumat di halaman 2.

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Kertas soalan ini mengandungi 21 halaman bercetak.

**INFORMATION FOR CANDIDATES**

1. *This question paper consists of 40 questions.*
2. *Answer **all** questions.*
3. *Answer each question by blackening the correct space on the answer sheet.*
4. *Blacken only **one** space for each question.*
5. *If you wish to change your answer, erase the blackened mark that you have done. Then blacken the space for the new answer.*
6. *The diagrams in the questions provided are not drawn to scale unless stated.*
7. *A list of formulae is provided on page 3 to 4.*
8. *You may use a non-programmable scientific calculator.*

### MATHEMATICAL FORMULAE

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

#### RELATIONS

$$1 \quad a^m \times a^n = a^{m+n}$$

$$2 \quad a^m \div a^n = a^{m-n}$$

$$3 \quad (a^m)^n = a^{mn}$$

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

$$5 \quad P(A) = \frac{n(A)}{n(S)}$$

$$6 \quad P(A') = 1 - P(A)$$

$$7 \quad \text{Distance} = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

$$8 \quad \text{Midpoint, } (x, y) = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$9 \quad \text{Average speed} = \frac{\text{distance travelled}}{\text{time taken}}$$

$$10 \quad \text{Mean} = \frac{\text{sum of data}}{\text{number of data}}$$

$$11 \quad \text{Mean} = \frac{\text{sum of (class mark} \times \text{frequency)}}{\text{sum of frequencies}}$$

12 Pythagoras Theorem

$$c^2 = a^2 + b^2$$

$$13 \quad m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$14 \quad m = - \frac{\text{y-intercept}}{\text{x-intercept}}$$

**SHAPES AND SPACE**

- 1 Area of trapezium =  $\frac{1}{2} \times \text{sum of parallel sides} \times \text{height}$
- 2 Circumference of circle =  $\pi d = 2\pi r$
- 3 Area of circle =  $\pi r^2$
- 4 Curved surface area of cylinder =  $2\pi r h$
- 5 Surface area of sphere =  $4\pi r^2$
- 6 Volume of right prism = cross sectional area  $\times$  length
- 7 Volume of cylinder =  $\pi r^2 h$
- 8 Volume of cone =  $\frac{1}{3} \pi r^2 h$
- 9 Volume of sphere =  $\frac{4}{3} \pi r^3$
- 10 Volume of right pyramid =  $\frac{1}{3} \times \text{base area} \times \text{height}$
- 11 Sum of interior angles of a polygon =  $(n - 2) \times 180^\circ$
- 12 
$$\frac{\text{arc length}}{\text{circumference of circle}} = \frac{\text{angle subtended at centre}}{360^\circ}$$
- 13 
$$\frac{\text{area of sector}}{\text{area of circle}} = \frac{\text{angle subtended at centre}}{360^\circ}$$
- 14 Scale factor,  $k = \frac{PA'}{PA}$
- 15 Area of image =  $k^2 \times \text{area of object}$

Answer **all** questions.

1 Round off 0.06307 correct to three significant figures.

- A 0.0600
- B 0.0630
- C 0.0631
- D 0.06310

2 Express  $2.314 \times 10^{-5}$  as a single number.

- A 0.02314
- B 0.002314
- C 0.0002314
- D 0.00002314

3  $\frac{1.4}{25000} =$

- A  $5.6 \times 10^{-5}$
- B  $5.6 \times 10^{-4}$
- C  $5.6 \times 10^4$
- D  $5.6 \times 10^5$

4  $10101_2 - 1001_2 =$

- A  $1000_2$
- B  $1010_2$
- C  $1100_2$
- D  $1110_2$

5 What is the value of digit 3 in base five in the number  $49\ 328_{10}$  ?

- A 1200
- B 2020
- C 2200
- D 2220

6 Diagram 1 shows a hexagon  $RSTUVW$ .  $MVUL$  is a straight line.

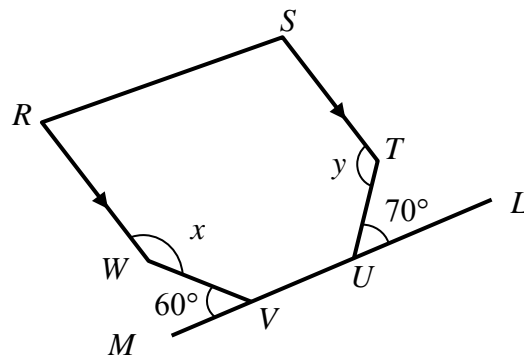


DIAGRAM 1

Calculate the value of  $x + y$ .

- A  $130^\circ$
  - B  $230^\circ$
  - C  $310^\circ$
  - D  $490^\circ$
- 7 It is given that  $\tan x = -1.28$  and  $0^\circ \leq x \leq 360^\circ$ , find the values of  $x$ .
- A  $52^\circ$  and  $128^\circ$
  - B  $52^\circ$  and  $232^\circ$
  - C  $128^\circ$  and  $218^\circ$
  - D  $128^\circ$  and  $308^\circ$

- 8 Diagram 2 shows a parallelogram  $KLMN$ .

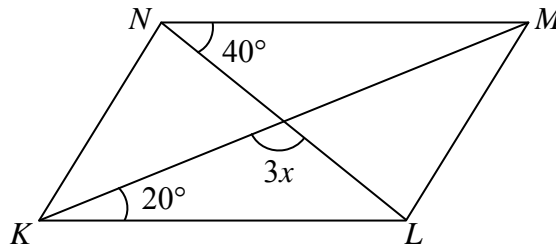


DIAGRAM 2

The value of  $x$  is

- A  $20^\circ$
  - B  $40^\circ$
  - C  $60^\circ$
  - D  $120^\circ$
- 9 In Diagram 3,  $JKL$  is a tangent to a circle with centre  $O$ , at point  $K$ .  $MOL$  is a straight line.

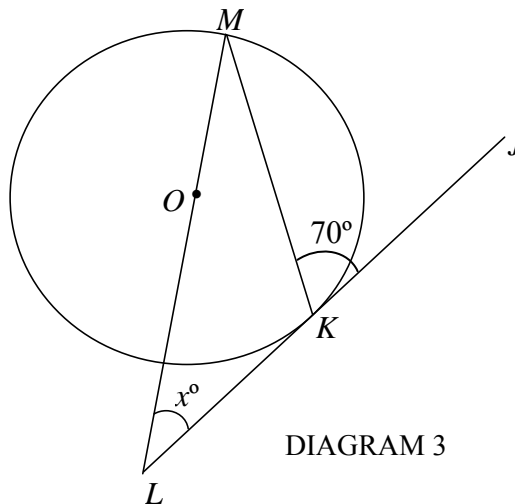


DIAGRAM 3

If  $\angle JKM = 70^\circ$ , find the value of  $x$ .

- A 30
- B 40
- C 50
- D 70

10 Diagram 4 shows five triangles drawn on square grids.

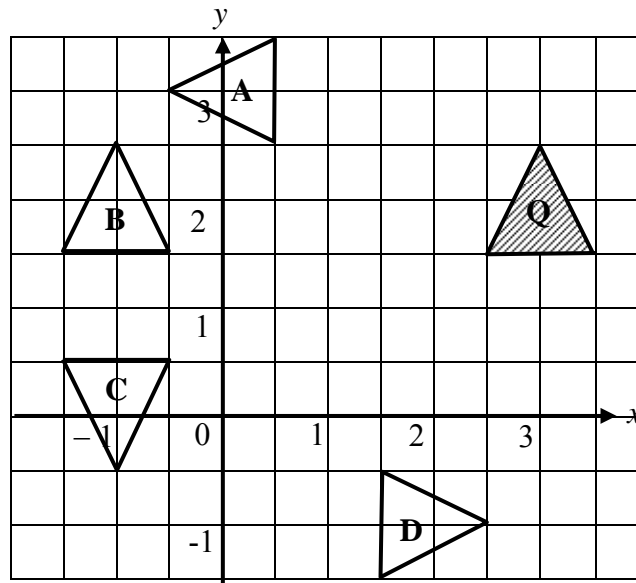


DIAGRAM 4

Which of the triangles, **A**, **B**, **C** or **D** is the image of triangle *Q* under an anticlockwise rotation of  $90^\circ$  about the centre  $(1,1)$  ?

11 Diagram 5 shows five polygons drawn on square grids.

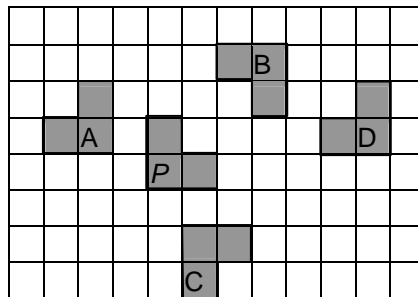


DIAGRAM 5

Which of the polygons **A**, **B**, **C** or **D** is the image of *P* under a reflection ?

- 12 In Diagram 6,  $PTQ$  is a straight line. Given  $\sin \angle QPR = \frac{5}{13}$ .

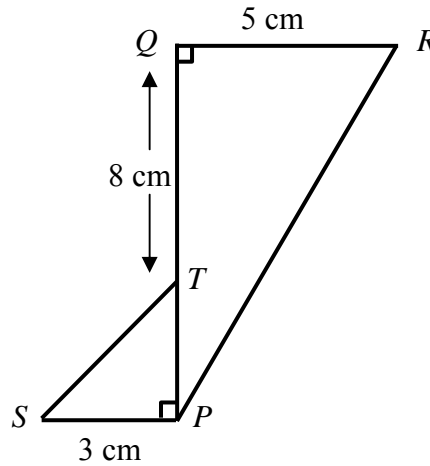


DIAGRAM 6

Find the value of  $\sin \angle STQ$ .

- A  $-\frac{4}{5}$
  - B  $-\frac{3}{5}$
  - C  $\frac{3}{5}$
  - D  $\frac{4}{5}$
- 13 Diagram 7 shows the position of points  $P$ ,  $Q$  and  $R$  on a map. Given that bearing of  $R$  from  $P$  is  $080^\circ$ .

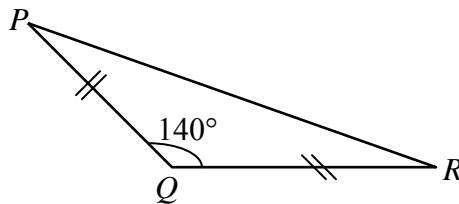


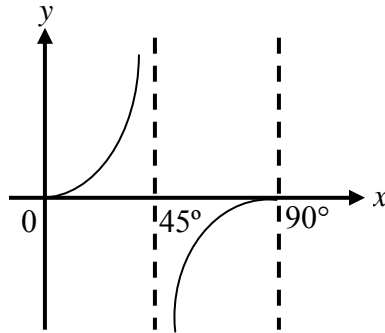
DIAGRAM 7

Find the bearing of  $Q$  from  $R$ .

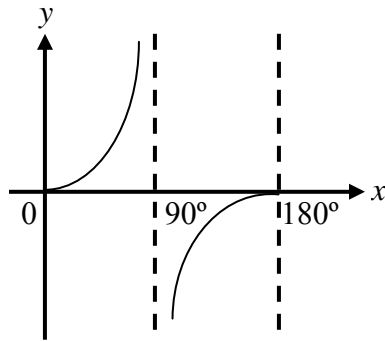
- A  $060^\circ$
- B  $240^\circ$
- C  $270^\circ$
- D  $300^\circ$

14 Which of the following graphs represents  $y = \tan x$ ?

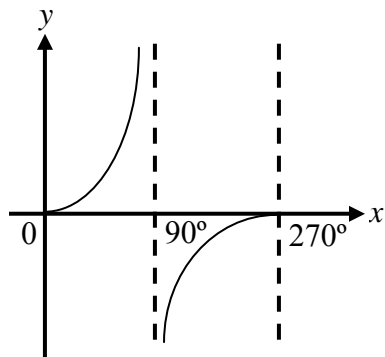
A



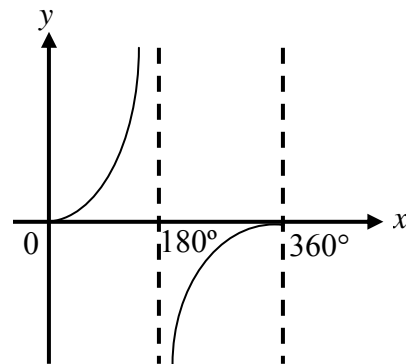
B



C



D



- 15 Diagram 8 shows a right prism with rectangle  $ABCD$  as its horizontal base.  $P$  and  $Q$  are the midpoints of  $BC$  and  $AD$ , respectively.

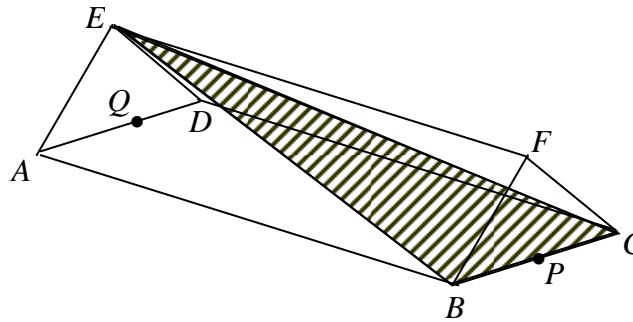


DIAGRAM 8

Name the angle between the plane  $BCE$  and the plane  $BCF$ .

- A  $\angle EPF$
  - B  $\angle EPQ$
  - C  $\angle PEF$
  - D  $\angle PEQ$
- 16 In Diagram 9,  $P$  and  $Q$  are two flag poles on a horizontal ground. It is given that the angle of elevation of peak  $Q$  from peak  $P$  is  $35^\circ$ .

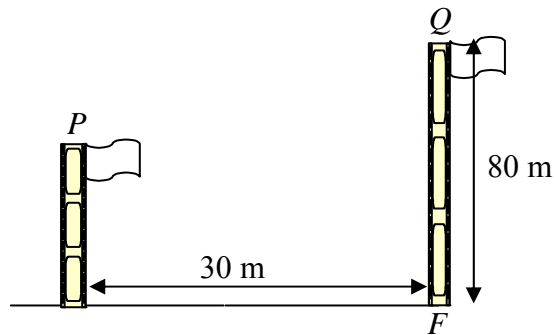


DIAGRAM 9

Find the height of pole  $P$ , in m.

- A 21.01
- B 39.62
- C 52.30
- D 58.99

- 17 In Diagram 10,  $N$  is the North Pole,  $S$  is the South Pole and  $NOS$  is the axis of the earth.

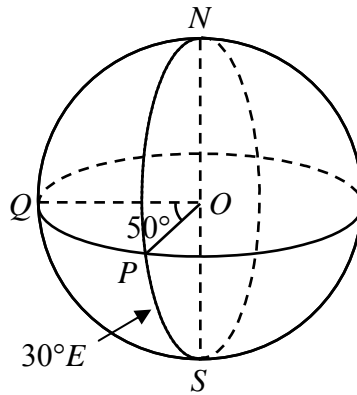


DIAGRAM 10

Find the longitude of  $Q$ .

- A  $20^\circ E$
  - B  $20^\circ W$
  - C  $80^\circ E$
  - D  $80^\circ W$
- 18 In Diagram 11,  $N$  and  $S$  are the North and South Poles respectively. The latitude of  $P$  is  $40^\circ N$  and  $PM = MS$ .

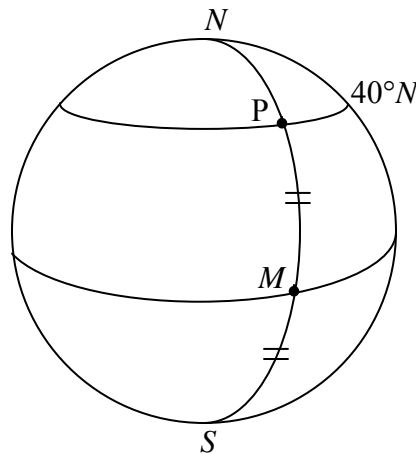


DIAGRAM 11

Find the latitude of  $M$ .

- A  $25^\circ S$
- B  $30^\circ S$
- C  $35^\circ S$
- D  $40^\circ S$

19  $x(x - 2y) - (y - x)^2 =$

- A  $-y^2$
- B  $2x^2 - y^2$
- C  $2xy - y^2$
- D  $-2xy - y^2$

20 Express  $\frac{5+m}{5m} - \frac{m+n}{mn}$  as a single fraction in its simplest form.

- A  $\frac{1-5m}{5}$
- B  $\frac{n-5}{5n}$
- C  $\frac{mn-5m}{5mn}$
- D  $\frac{10n+mn-5m}{5mn}$

21 Given that  $n = 4\left(\frac{m}{8} + 3\right)$ , express  $m$  in terms of  $n$ .

- A  $2(n - 12)$
- B  $2n - 12$
- C  $n - 12$
- D  $n + 12$

22 Given that  $5e - 4 = 16 - (e + 5)$ , calculate the value of  $e$ .

A  $\frac{6}{25}$

B  $\frac{2}{5}$

C  $\frac{5}{2}$

D  $\frac{25}{6}$

23 Simplify  $(2p^{-2}q)^3 \times \frac{1}{2}p^2q^{-1}$ .

A  $4p^{-4}q^2$

B  $4p^{-8}q^4$

C  $p^{-4}q^2$

D  $p^{-8}q^4$

24 Given that  $\left(\frac{1}{4}\right)^n \times 16 = 2$ , find the value of  $n$ .

A 2

B  $\frac{3}{2}$

C  $-\frac{3}{2}$

D -2

25 List all the integers  $k$  that satisfy the inequalities  $5(k - 3) < k + 5$  and  $5 - 2k \leq 7$ .

- A 0, 1, 2, 3, 4
- B 0, 1, 2, 3, 4, 5
- C -1, 0, 1, 2, 3, 4
- D -1, 0, 1, 2, 3, 4, 5

26 In Diagram 12, the histogram shows the time spent by a group of students watching television on a certain day.

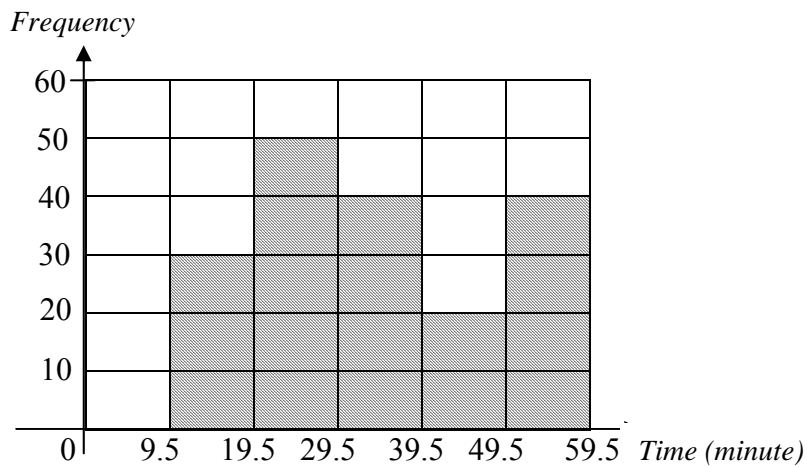


DIAGRAM 12

Calculate the mean, in minutes, of the time spent by the students watching television.

- A 39.94
- B 39.54
- C 33.95
- D 33.94

- 27 The pictograph in Diagram 13 shows the number of television sets sold by a shop in three particular days. The number of television sets sold on Wednesday is not known.

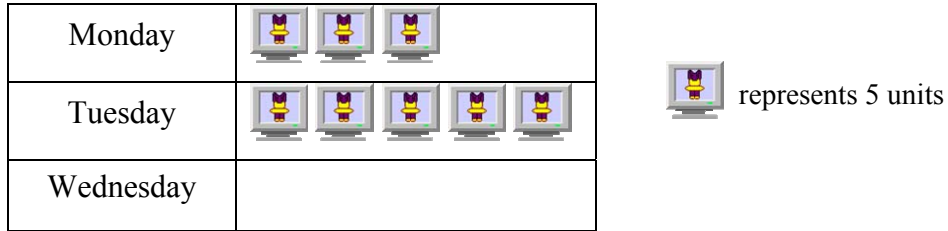
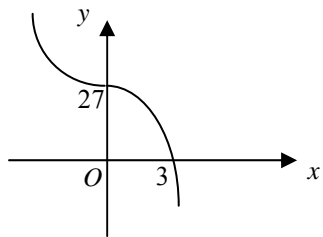


DIAGRAM 13

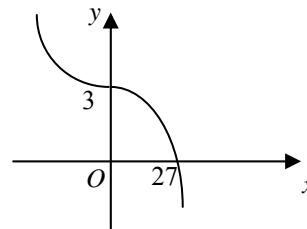
Sales on Monday makes up 30 % of the total sale of the three days. The number of television sets sold on Wednesday is

- A 10
  - B 30
  - C 40
  - D 50
- 28 Which of the following represents the graph of  $y = -x^3 + 27$

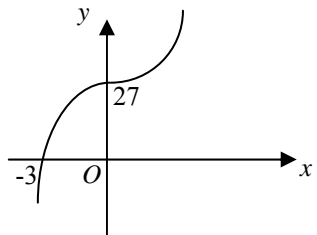
A



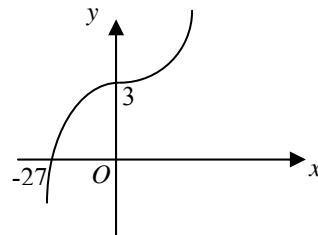
B



C



D



29 In Diagram 14,  $\xi$  is the universal set.

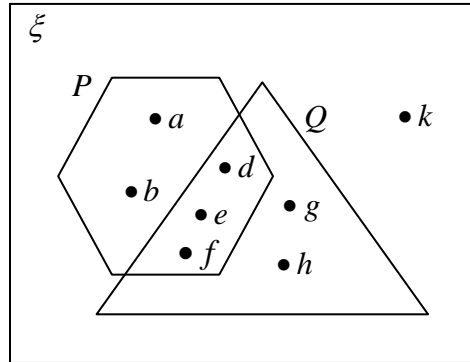


DIAGRAM 14

Set  $Q \cap P'$  is

- A  $\{d, e, f, g, h\}$
- B  $\{d, e, f\}$
- C  $\{g, h\}$
- D  $\{k\}$

30 Diagram 15 is a Venn diagram, which shows sets  $J$ ,  $K$  and  $M$ . The universal set  $\xi = J \cup K \cup M$ .

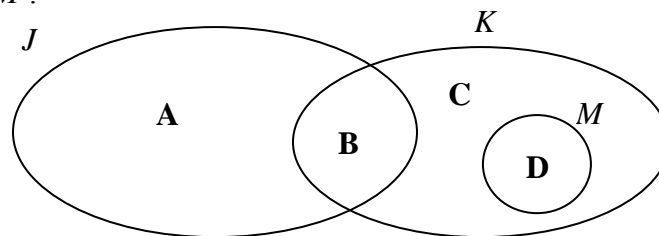


DIAGRAM 15

Which of the region, **A**, **B**, **C**, or **D** represents the set  $(J \cap K)' \cap M$ ?

- 31 Given a universal set ,  $\xi = \{ x : x \text{ is an integer , } 16 \leq x \leq 28 \}$  and  $T = \{ x : x \text{ are numbers where the sum of its digits is less than 5 } \}$  . Find  $n(T')$

- A 3  
 B 7  
 C 10  
 D 11

- 32 In Diagram 16,  $TV$  is a straight line.

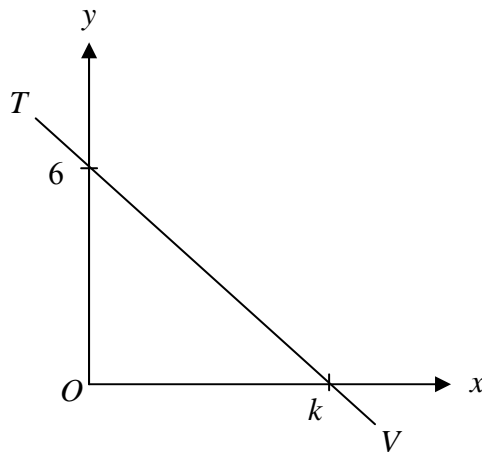


DIAGRAM 16

Given the gradient of the straight line  $TV$  is  $-\frac{2}{3}$  . Find the value of  $k$ .

- A 3  
 B 4  
 C 6  
 D 9

- 33 From the following straight line equations, the straight line which is parallel to the x-axis is
- A  $y = -x$
  - B  $y = 2$
  - C  $x = y$
  - D  $x = 2$
- 34 Shafik has a collection of coins from Britain, Indonesia and the Philippines. He picks one coin at random. The probability of picking an Indonesian coin is  $\frac{1}{3}$  and the probability of picking a Philippine coin is  $\frac{4}{9}$ . Shafik has 10 British coins. Calculate the total number of coins in his collection.
- A 70
  - B 45
  - C 35
  - D 30
- 35 A bag contains 3 black cards, 7 red cards and 5 blue cards. A card is picked at random from the bag. State the probability of picking a card that is not black.
- A  $\frac{3}{15}$
  - B  $\frac{5}{15}$
  - C  $\frac{7}{15}$
  - D  $\frac{12}{15}$

- 36 Given the matrix equation  $2\begin{pmatrix} 3 & -r \end{pmatrix} - s\begin{pmatrix} 1 & 2 \end{pmatrix} = \begin{pmatrix} 4 & 10 \end{pmatrix}$ . Find the value of  $r + s$ .
- A 5  
B 2  
C -2  
D -5
- 37  $\begin{pmatrix} 3 & 4 \end{pmatrix} \begin{pmatrix} -1 \\ 2 \end{pmatrix} =$
- A  $\begin{pmatrix} -3 & -4 \\ 6 & 8 \end{pmatrix}$   
B  $\begin{pmatrix} -3 \\ 8 \end{pmatrix}$   
C (5)  
D (-3 8)
- 38 Given  $S$  varies inversely as the square of  $T$  and  $S = 36$  when  $T = \frac{1}{2}$ . Express  $S$  in terms of  $T$ .
- A  $S = \frac{9}{T^2}$   
B  $S = \frac{18}{T^2}$   
C  $S = \frac{36}{T^2}$   
D  $S = \frac{72}{T^2}$

- 39 Table 1 shows the values of variables  $m$  and  $n$ .

$m$	1	4
$n$	8	$p$

TABLE 1

If  $m \propto \frac{n}{4}$ , find the value of  $p$ .

- A 2  
B 8  
C 16  
D 32
- 40 Table 2 shows some values of  $p$ ,  $q$ , and  $r$ .

$p$	$\frac{2}{3}$	$\frac{1}{5}$
$q$	2	4
$r$	9	$m$

TABLE 2

Given that  $p \propto \frac{1}{q\sqrt{r}}$ , calculate the value of  $m$ .

- A 5  
B 18  
C 15  
D 25

**END OF QUESTION PAPER**