1449/1
Matematik
Kertas 1
Mei 2007
$1\frac{1}{4}$ jam

SEKTOR SEKOLAH BERASRAMA PENUH
BAHAGIAN SEKOLAH
KEMENTERIAN PELAJARAN MALAYSIA

PEPERIKSAAN PERTENGAHAN TAHUN
TINGKATAN 5 2007

MATEMATIK

Kertas 1

Satu jam lima belas minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. Kertas soalan ini adalah dalam Bahasa Inggeris.

2. Calon dikehendaki membaca maklumat di halaman 2.

Kertas soalan ini mengandungi 24 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 $a^m \times a^n = a^{m+n}$

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

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

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

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

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

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

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

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

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

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

12 Pythagoras Theorem

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

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

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

SHAPES AND SPACE

1 Area of trapezium = $\frac{1}{2}$ × sum of parallel sides × height

2 Circumference of circle = $\pi d = 2\pi r$

3 Area of circle = πr^2

4 Curved surface area of cylinder = $2\pi rh$

5 Surface area of sphere = $4\pi r^2$

6 Volume of right prism = cross sectional area × 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 = $\frac{1}{3}$ × base area× 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 × area of object

Answer **all** questions

1 Round off 0.03204 correct to three significant figures.

A 0.03

B 0.032

C 0.0320

D 0.0321

2 $5.82\times10^{-8} - 2.37\times10^{-9} =$

A 2.752×10^{-9}

B 3.45×10^{-9}

C 5.583×10^{-8}

D 6.372×10^{-8}

3 $\dfrac{5.94\times10^{-2}}{\left(3\times10^{-3}\right)^2} =$

A 1.98×10^{3}

B 1.98×10^{4}

C 6.6×10^{3}

D 6.6×10^{4}

4 Diagram 1 shows a rectangle and three regular octagons. Given that the area of an octagon is 23.343 unit^2.

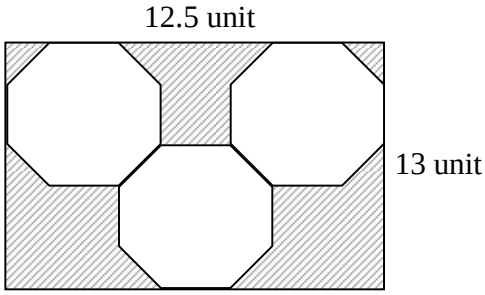


DIAGRAM 1

Find the area of the shaded regions and give your answer correct to three significant figures.

A 92.4 unit^2

B 92.5 unit^2

C 92.400 unit^2

D 92.500 unit^2

5 Express 423_5 as a number in base eight.

A 161_8

B 651_8

C 113_8

D 110_8

6 $100111_2 - 10101_2 =$

A 10010_2

B 11010_2

C 11101_2

D 10011_2

7 In Diagram 2, *PQRST* is a regular pentagon. *UTR* is a straight line.

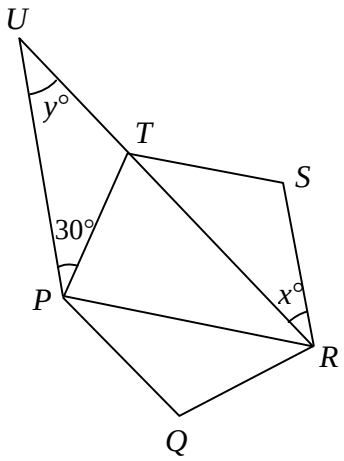


DIAGRAM 2

The value of $x + y =$

A 36

B 42

C 78

D 108

8 In Diagram 3, *PQRS* is a rhombus, *PSTU* is a trapezium and *QST* is a straight line.

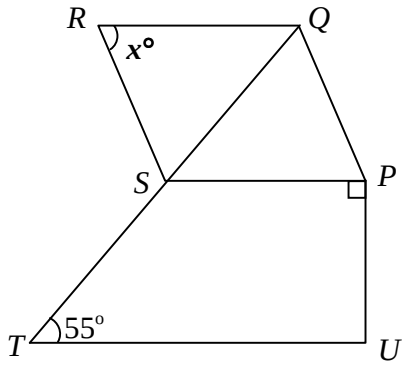


DIAGRAM 3

The value of x is

A 55^O

B 60^O

C 70^O

D 75^O

9 Diagram 4 shows a circle with centre *O*. *LM* and *LN* are tangents to the circle at points *M* and *N* respectively.

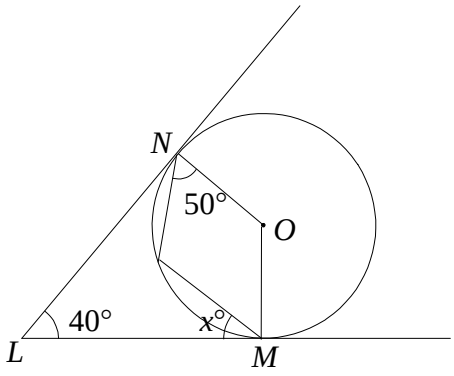


DIAGRAM 4

Find the value of *x*.

A 30

B 40

C 50

D 60

10 In Diagram 5, *PQRS* is a cyclic quadrilateral and *TS* is a tangent to the circle at point *S*.

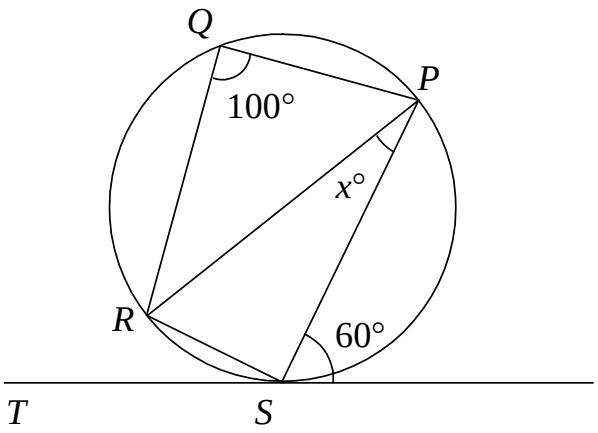


DIAGRAM 5

Find the value of *x*.

A 30

B 40

C 60

D 80

11 Diagram 6 shows points plotted on Cartesian plane.

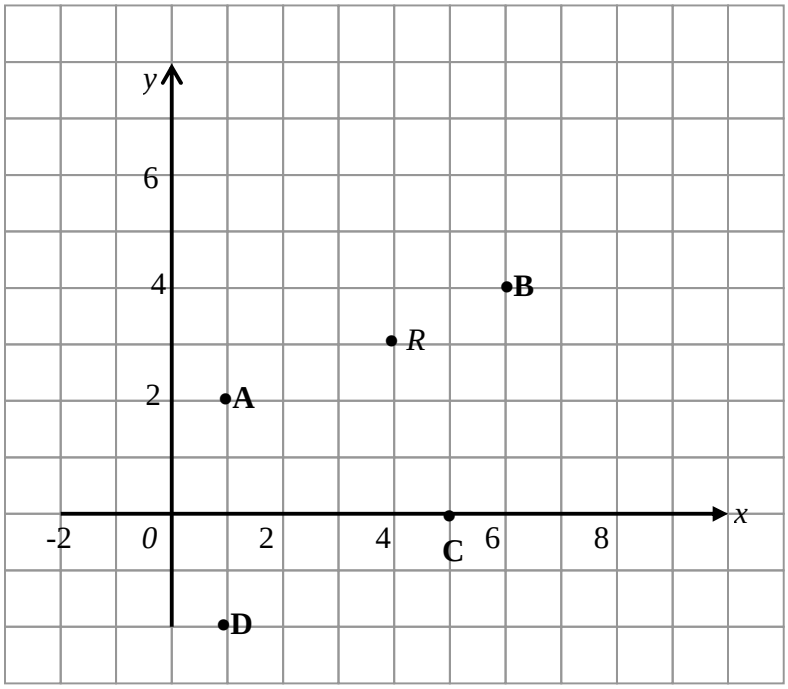


DIAGRAM 6

Determine which of the point, **A**, **B**, **C** or **D,** is the image of point *R* under a 90° anticlockwise rotation about the centre (3, 1).

12 Diagram 7 shows two quadrilaterals, $PQRS$ and $PQ'R'S'$ drawn on square grids. Quadrilateral $PQ'R'S'$ is the image of quadrilateral $PQRS$ under an enlargement at centre P with the scale factor k.

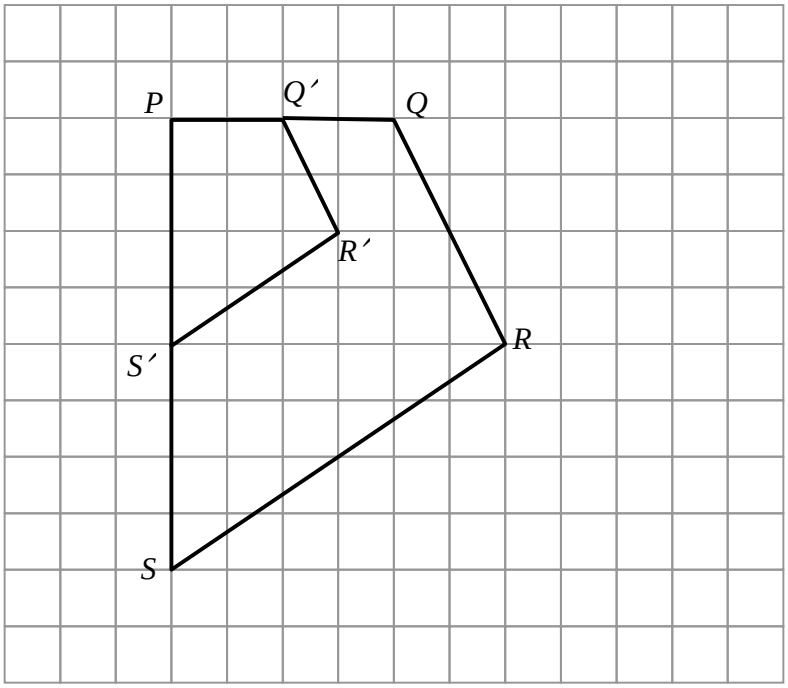


DIAGRAM 7

Find the value of k.

A -2

B $-\frac{1}{2}$

C $\frac{1}{2}$

D 2

13 In Diagram 8, O is the centre of a unit circle.

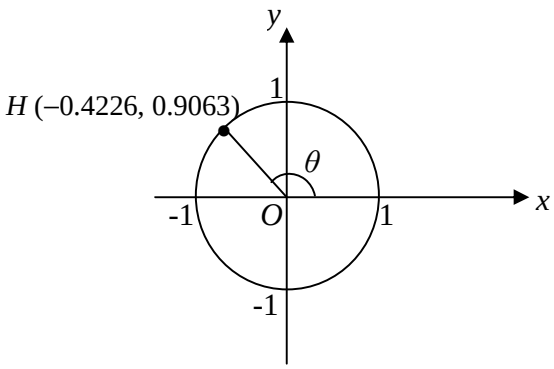


DIAGRAM 8

Find the value of sin θ.

A –0.9063

B –0.4226

C 0.9063

D 2.1446

14 Diagram 9 shows the graph of $y = \cos x°$.

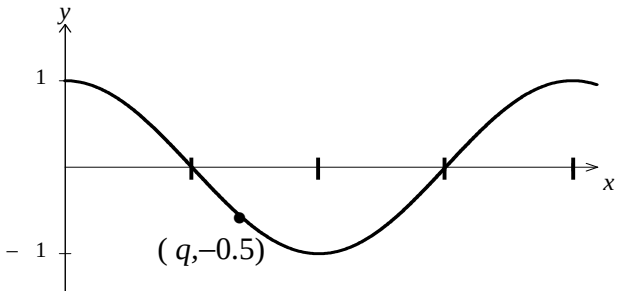


DIAGRAM 9

Find the value of q.

A 90°

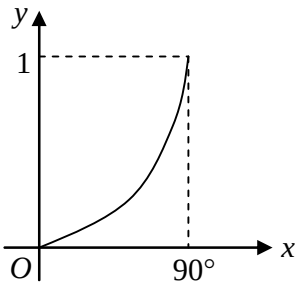
B 120°

C 150°

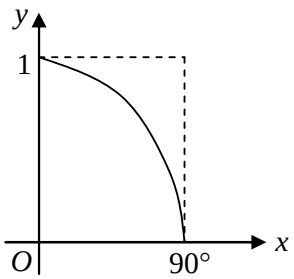
D 210°

15 Determine which of the following is the graph of $y = \sin x°$ for $0° \leq x \leq 90°$.

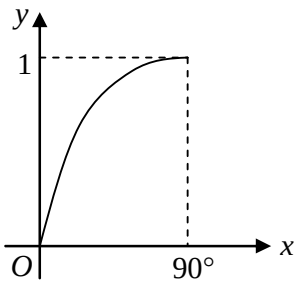
A



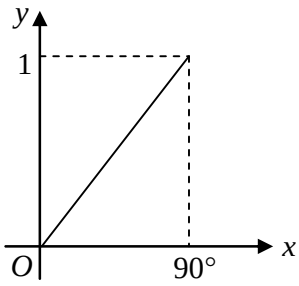
B



C



D



16 Diagram 10 shows a right triangular prism. *U* is the midpoint of *TV*.

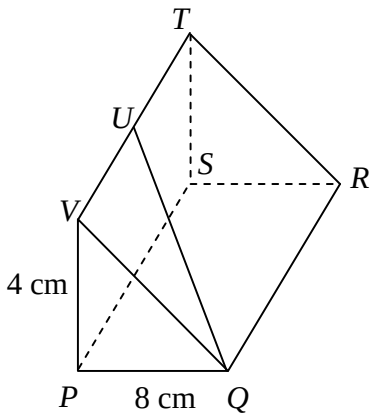


DIAGRAM 10

Name the angle between the line *UQ* and the plane *PSTV*.

A $\angle PQU$

B $\angle QUP$

C $\angle QPU$

D $\angle QUV$

17 Express $\frac{2}{3} - \frac{m-5}{4m}$ as a single fraction in its simplest form.

A $\frac{7m-5}{12m}$

B $\frac{7m+5}{12m}$

C $\frac{5(m-3)}{12m}$

D $\frac{5(m+3)}{12m}$

18 $5p^2 - p(3 - p)$

A $4p^2 - 3$

B $4p^2 - 3p$

C $6p^2 - 3$

D $6p^2 - 3p$

19 $15p^2 - 11p - 12 =$

A $(3p+2)(5p-6)$

B $(3p-2)(5p+6)$

C $(3p+4)(5p-3)$

D $(3p-4)(5p+3)$

20 Given that $p - 3(p - 2) = 3(p + 2r)$, express p in terms of r.

A $\frac{6(r-1)}{5}$

B $\frac{6(1-r)}{5}$

C $\frac{-6(r+1)}{5}$

D $\frac{-2(r-3)}{5}$

21 Given that $\sqrt{y+1} = 2x - 3$, express y in terms of x.

A $4x^2 - 12x + 8$

B $x^2 - 3x + 2$

C $4x(1 - 3x)$

D $(2x - 4)^2$

22 Simplify $\left(x^{\frac{1}{3}} y^{3} \right)^{3} \div \left(x^{2} y^{-5} \right)$

A $x^{-1} y^{1}$

B $x^{-1} y^{4}$

C $x^{-1} y^{11}$

D $x^{-1} y^{14}$

23 Simplify $\dfrac{\left(\sqrt{64}\right)^{\frac{1}{3}} \times 27^{\frac{2}{3}}}{2^{3}}$.

A $2^{-1} \times 3^{2}$

B $2^{-2} \times 3^{2}$

C $2^{-2} \times 3^{3}$

D $2^{-3} \times 3^{2}$

24 Given that $5k - 4 = -2(3 - k)$, then $k =$

A $-\dfrac{2}{7}$

B $-\dfrac{1}{3}$

C $-\dfrac{1}{2}$

D $-\dfrac{2}{3}$

25 List all the integers x which satisfy both of the inequalities $4x + 6 \geq -6$ and $2 - x \geq 0$.

A –3, –2, –1, 0, 1, 2

B –2, –1, 0, 1, 2

C –2, –1, 1, 2

D 0, 1, 2

26 The solution for $3 - m < 8$ and $6 + 2m \leq 2$ is

A $5 < m \leq -2$

B $-5 < m \leq -2$

C $-2 \leq m \leq 5$

D $-2 < m \leq 5$

27 Table 1 shows the frequency of the score obtained in a game.

Score	0	1	2	3	4
Number of student	x	4	2	3	6

TABLE 1

Given that the median score is 2, find the value of x.

A 1

B 2

C 3

D 4

28 Diagram 11 shows the monthly expenditure among the students of 5 Alfa and 5 Beta.

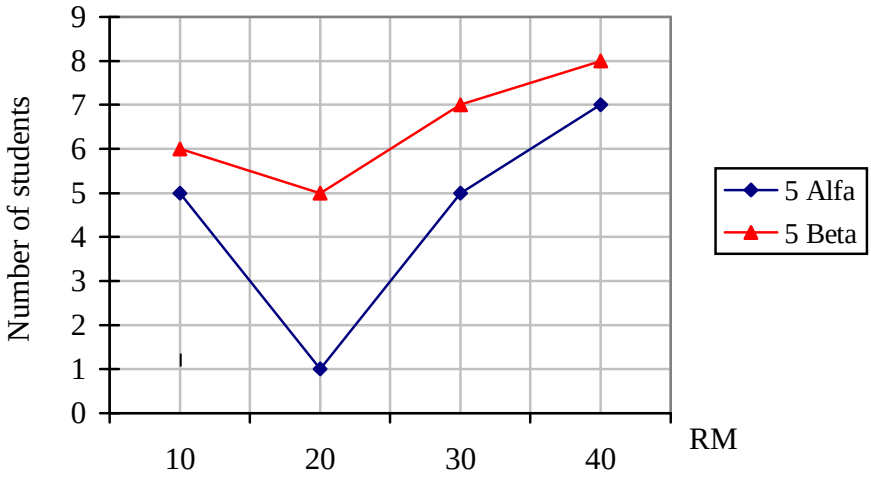


DIAGRAM 11

Calculate the mean of expenditure, in RM, of the students from the two classes.

A RM 5.00

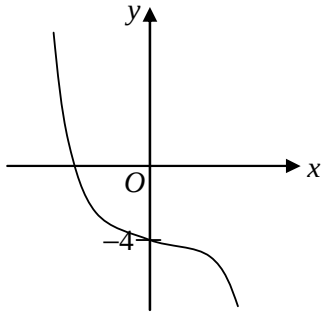
B RM 25.00

C RM 26.38

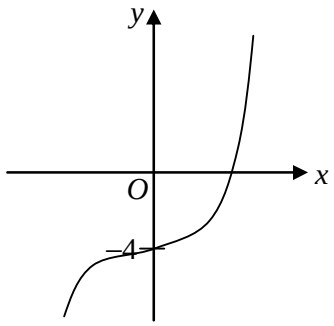
D RM 27.05

29 Determine which of the following graphs represents $y = 2x^3 - 4$.

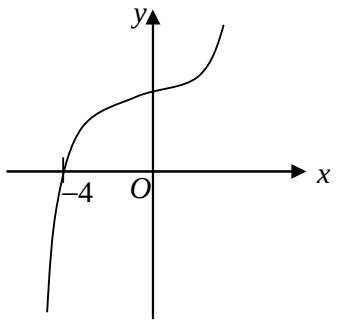
A



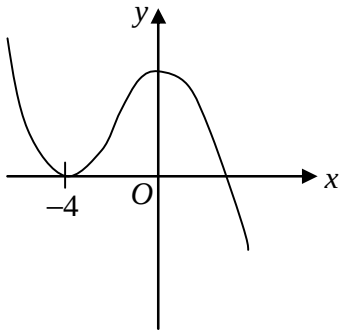
B



C



D



30 Diagram 12 shows a Venn diagram with the universal set, ξ, set P, Q, and R.

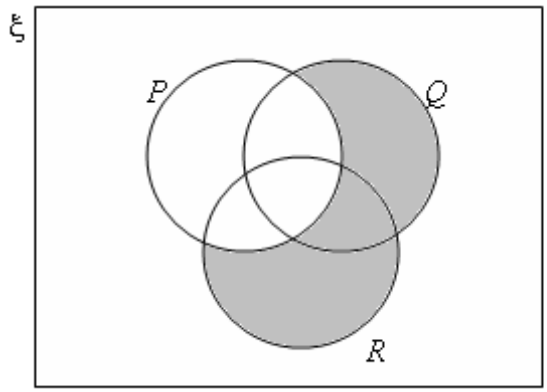


DIAGRAM 12

The shaded region in the Venn diagram represent the set

A $P' \cap (Q \cup R)$

B $P \cap Q \cap R$

C $P \cap Q \cup R'$

D $P \cup Q \cap R$

31 Diagram 13 shows the number of elements in set X, Y and Z.

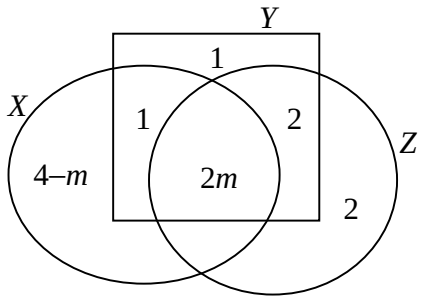


DIAGRAM 13

Given that n(X) = n(Y), find the value of m.

A 1

B 2

C 3

D 4

32 Given that the universal set $\xi = R \cup S \cup T$. Set $R = \{D, I, C, E\}$, Set $S = \{C, A, R, D\}$ and Set $T = \{C, O, I, N\}$.
Set $(R \cup T') \cap S$ is

A $\{D, I, C, E, A, R, O, N\}$

B $\{D, I, C, E\}$

C $\{C, A, R, D\}$

D $\{C, D\}$

33 Table 2 shows the relation between three variables *g*, *h* and *f*.
Given that *g* varies directly as *h* and varies inversely as *f*.

g	*h*	*f*
3	*x*	6
$2\frac{1}{2}$	10	2

TABLE 2

Find the value of *x*.

A 4

B 18

C 25

D 36

34 Given that $y \propto \frac{1}{(x+2)^n}$ and $y = \frac{1}{2}$ when $n = 2$ and $x = 2$.
Find the value of n when $y = 1$ and $x = 6$.

A $\frac{1}{8}$

B $\frac{1}{2}$

C 1

D 2

35 A straight line *PQ* with gradient $\frac{1}{4}$ passes through the point (4, 9).
Find the *y*-intercept of the line.

A 7

B 8

C 10

D 20

36 A straight line passes through the points $K(0, 2t)$ and $L(t^2, 0)$ and has a gradient of $-\frac{1}{4}$, find the value of t.

A –8

B –2

C 2

D 8

37 A box contains 42 red pens and blue pens. If a pen is picked randomly from the box, the probability of picking a blue pen is $\frac{4}{7}$.
Find the number of red pen.

A 18

B 24

C 38

D 42

38 A two digit number is created from the digits in the set R.
Given that $R = \{ x : 2 \leq x \leq 4, x \text{ is an integer} \}$.
Find the probability that the sum of the two digits is greater than 5.

A 0

B $\frac{1}{3}$

C $\frac{2}{3}$

D 1

39 Diagram 15 shows a bar graph which represent the games played by a group of students.

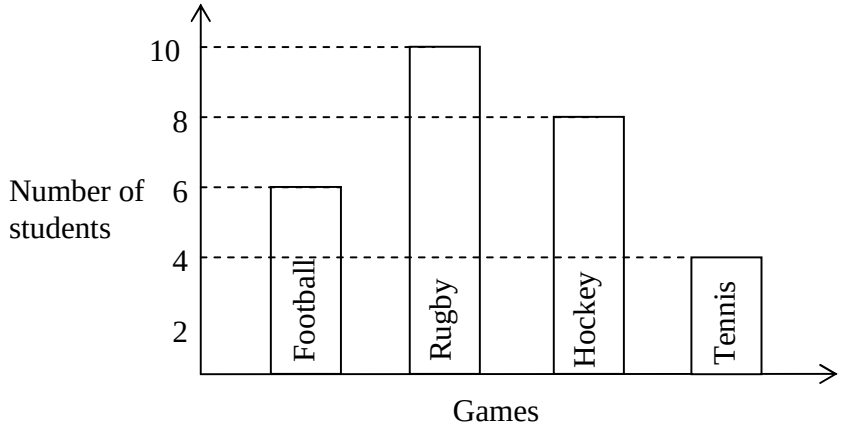


DIAGRAM 15

If a student is chosen randomly from the group, state the probability that the student likes to play football.

A $\frac{1}{7}$

B $\frac{3}{14}$

C $\frac{2}{7}$

D $\frac{5}{14}$

40 $\begin{pmatrix} 4 & k \\ 0 & 3 \end{pmatrix} \begin{pmatrix} 2 & 1 \\ 0 & 6 \end{pmatrix} = \begin{pmatrix} 2 & 1 \\ 0 & 6 \end{pmatrix} \begin{pmatrix} 4 & k \\ 0 & 3 \end{pmatrix}$

Find the value of k.

A $-\frac{1}{8}$

B $-\frac{1}{4}$

C $\frac{1}{4}$

D $\frac{7}{4}$

END OF QUESTION PAPER