S3 MATHS EXERCISES

**NO: 1**

1. A cuboid has dimesions 3cm, 4cm, and 5cm. It is enlarged by a scale factor 2.

a) What is the volume of the cuboid?

b) What is the volume of the image cuboid?

c) What is the ratio of the volume of the image cuboid to the original cuboid?

1. A triangle has sides measuring 16cm by 48cm by 50cm. Is the triangle right-angled?
2. Square A(-2, -1), B(1, -1), C(1, -4), D(-2, -4) is enlarged to square A’(4, 1), B’(3, 1), C’(3, 2), D’(4, 2).

a) Choose a suitable scale and draw these squares on graph paper.

b) Hence find the scale factor and the coordinates of the centre of enlargement.

1. Determine the circumference and area of the sector of circle which subtends an angle of 420at the centre of a circle of radius 6cm. Take $π=\frac{22}{7}$.
2. Solve graphical the following simultaneous inequalities by shading the unwanted region:

$$\sum\_{}^{}\begin{array}{c}x+y-3\leq 0\\x-y-1\geq 0\end{array}$$

1. Make R the subject of formula:

$L=\frac{2V}{R+2X}$ hence , find the value of R when V=250, L=100, and X=0.5.

1. Show that points P(1, 2), Q(0, -1), and R(-2, -7) are collinear.
2. Given that the points A(0, -2), B(1, -5), C(4, -4), and D(4, 1), show that vectors $\vec{AC}$ and $\vec{BD}$ are orthogonal.
3. In a class of 53 students, 30 study Chemistry, 20 study Physics, 15 study Mathematics. 6 study both Chemistry and Physics, 4 study both Mathematics and Chemistry, 5 study both Physics and Mathematics. All the students study at least one of the subjects.

a) Represent the information on venn diagram.

b) Find the number of students who study all subjects.

C) How many students who like at least two subjects.

1. Evaluate:

a) 12+ 112+ 10112+ 1100112

b) 10101012- 11112

c) 1234$×$2134

1. The value of a car depreciates by 10% of its value each year. If the car was valued at 5500000frw on 1st January, 2000, calculate the value of the car on 1st January, 2003.
2. Draw a graph of $y=2x^{2}-8x+6$
3. Given that the line $y=3x+a$ passes through (1, 4), find the value of a.
4. Find the equation of a straight line which pass through points A(3, 7) and B(6, 1).
5. By using Cramer’s rule and substitution method solve the following simultaneous equations:

$$x-2y-1=0 and y+3x+1=0$$

1. The expression $ax^{5}+4x^{4}+bx^{3}-10x^{2}+3x+6$ is exactly divisible by $(x+2)(x-1)$ find the values of a and b, hence factorize the expression completely.

**N0: 2**

1. Find the values of $a$, $b$ and $c$ in the identity: $2x^{2}-x+1=a(x-1)^{2}+b\left(x-1\right)+c$
2. Given that $f\left(x\right)= x^{3}+2x^{2}+ax+b$, find $a$ and $b$ if $f\left(2\right)=f\left(-3\right)=0$. Hence factorize $f(x)$ completely.
3. Solve the following pair of simultaneous inequalities: $2\left(3-x\right)\leq 10$ and $3(2x-5)\leq 21$
4. The table below shows the marks obtain by 40 senior three students in a mathematics test. Draw a frequency table, after grouping the values into classes of width 10, starting from 41-50. Use it to find the mean.

54 83 67 71 80 65 70 72 45 60 72 82 79 78 65 54 67 64 54 76 45 63 49 52 60 70 81 67 45 58 69 53 65 43 55 68 49 61 75 52

1. Given that A and B represent 10 and 11 respectively in base twelve, solve for x in;

*a) 12A 12+ 4AB12= X ten*

*b) 789 12- AB12=X nine*

1. *Find the equation of the line that is parallel to another line whose equation is* $x+2y+8=0$ *and passes through the point (-2, -3)*
2. *For purposes of sales promotion, the price of a book has been reduced by 20% to 3600frw. What was the price before the reduction?*
3. *The vertices of a triangle ABC are A(1, 2), B(1, 6), C(3, 5), draw a triangle ABC in Cartesian plane.*

*b) Find A’B’C’ the image of ABC under rotation of 900 clockwise about origin.*

*c) Find A’B”C” the image of ABC under enlargement of scale factor -2 about origin*

1. *The table below shows the marks (out of 10). Obtained by 20 students in computer test.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Marks(x)* | *0-1* | *2-3* | *4-5* | *6-7* | *8-9* |
| *Frequency(f)* | *2* | *x* | *3* | *y* | *4* |

If the mean mark is 4.8, find the values of x and y.

b) Draw the histogram, to estimate the mode.

1. $x$ varies inversely with $y+3$, and $x=6$ when $y=4$, find the value of $y$ when $x=3$.