**S 3 MATH TEST/ QUIZ TERM 1**

**TEST: 1**

1. Solve the following simultaneous equations

$\left\{\begin{array}{c}2a+3b=16\\4a+5b=28\end{array}\right\}$

1. Peter has 25 coins in his pocket. Some of them are 10frw and the rest are 20frw coins. The total value of the coins is 360frw. Find the number of 10frw and 20frw coins.
2. Solve graphically the simultaneous inequalities by shading the unwanted region.

$4x+3y<12$ and $y\geq 0$ and $x\geq 0$

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. If $\vec{u}=\left(\begin{array}{c}2\\3\end{array}\right)$, $\vec{v}=\left(\begin{array}{c}-1\\4\end{array}\right)$ and $\vec{w}=\left(\begin{array}{c}3\\-1\end{array}\right)$, find:

a) $\vec{u}+\vec{v}-\vec{w}$

b) $3\vec{u}-2\vec{v}+2\vec{w}$

c) $\left‖2\vec{v}+\vec{w}\right‖$

d) $\left‖\vec{u}\right‖+\left‖\vec{w}\right‖$

1. Solve for $x$ in the following:

a) $12A\_{12}+ 4AB\_{12}= x\_{10 }$

b) $142\_{x}- 53\_{x}= 67\_{x}$

1. Simplify the fractions, stating the restrictions:

$\frac{y^{2 }-7y+6}{y-6}$

1. Solve the equations: $\frac{3x+2}{3x+4}= \frac{x-1}{x+1}$
2. 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. 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. Twenty five students in a class obtained the following marks out of 50.

13 12 25 31 40 49 12 20 25 12 13 41 31 40 15 13 20 20 31 13 15 25 25 13 12.

a) Make frequency table distribution to find:

 i) the mean.

 ii) the mode.

 iii) the median

 iv) the range

1. The table below shows the masses of 30 students in kg:

45 62 35 54 48 35 48 59 52 40 54 46 59 51 32 37 49 42 53 38 37 35 53 46 48 44 33 52 54 44.

a) Group the values into classes of interval 5kg starting with 30 – 34.

b) Calculate the mean mass of students.

c) Write the modal class and its limits.

1. Given that A(2, 4), B(6, 4), C(6, 7) and D(2, 7), are the vertices of a rectangle ABCD, plot a rectangle ABCD in Cartesian plane.

b) Find A’B’C’D’ the image of rectangle ABCD under central symmetry about origin.

c) Find A”B”C”D” the image of rectangle ABCD under reflection on line $y=-1$.

d) Find A’”B’”C’”D’” the image of rectangle ABCD under rotation of 900 clockwise about origin.

e) Find MNPR the image of rectangle ABCD under enlargement of scalar factor k= -2 about origin.

f) Calculate the perimeter of rectangle ABCD.

 **TEST: 2**

**MOCK OF MATHEMATICS SENIOR THREE OUT OF 40marks**

1. If $\vec{u}=\left(\begin{array}{c}2\\3\end{array}\right)$, $\vec{v}=\left(\begin{array}{c}-1\\4\end{array}\right)$ and $\vec{w}=\left(\begin{array}{c}3\\-1\end{array}\right)$, find:

a) $\vec{u}+\vec{v}-\vec{w}$

b) $3\vec{u}-2\vec{v}+2\vec{w}$

c) $\left‖2\vec{v}+\vec{w}\right‖$

d) $\left‖\vec{u}\right‖+\left‖\vec{w}\right‖$

1. Find the coordinates of midpoint of segment $\left[AB\right]$, where $A(-2, 5)$ and $B\left(6, -3\right).$
2. i) Draw, in Cartesian plane triangle ABC, where A (-3, 3); B (-2, 2) and C (4, 0).

ii) Find the coordinates of A’B’C’ the image of ABC under the translation of vector $\vec{u}=\left(\begin{array}{c}-2\\0\end{array}\right)$ and draw it.

iii) Find the coordinates of A”B”C” the image of ABC under rotation about origin of axes, through $270^{0}$ and draw it.

iv) Given that A(-3, 3) is mapped onto A”’(-1, 3) by a reflection, find the equation of mirror line, then determine the coordinates of B’’’ and C”’, images of B and C, and draw it.

v) Calculate the perimeter of triangle ABC.

1. The table below gives the marks of 50 students in a test.

35 51 83 60 61 73 44 90 70 93 56 34 52 61 43 57 40 58 88 64 52 71 25 86 79 35 73 44 71 95 63 53 48 78 65 98 28 72 67 82 46 54 62 35 70 41 63 73 50 68.

a) Group the values into classes of width 10, starting from [21-30] and make the frequency table.

b) Find the mean.

c) Find the modal class and its limits.

d) Calculate mode.

e) Draw histogram to estimate mode.

1. Twenty five students in a class obtained the following marks out of 50.

13 12 25 31 40 49 12 20 25 12 13 41 31 40 15 13 20 20 31 13 15 25 25 13 12.

a) Make frequency table distribution to find:

 i) the mean.

 ii) the mode.

 iii) the median

 iv) the range

 b) Draw histogram of the data.

 **TEST : 3**

1. Find the equation of the line which passes through points (1, -2) and (-2, 1).
2. The line passing through points A(1, 0) and B(a, 2) is perpendicular to line 2y= 3x+4. Find the value of a.
3. Points A(a, -3), B(b, 0), and C(c, 3) lie on the line y= 5x- 2. Find the values of a, b, and c.
4. *For purposes of sales promotion, the price of a book has been reduced by 20% to 3600frw. What was the price before the reduction?*
5. By using Cramer’s rule and substitution method solve the following simultaneous equations:

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

1. Given that $p\left(x\right)=2x^{3}+9x^{2}+7x-6$, factorise $p(x)$ completely, hence solve for $x$ when $p\left(x\right)=0$
2. Without using calculator find the exact value of $\left(3-2\sqrt{2}\right)$40$\left(3+2\sqrt{2}\right)$40.
3. Solve for $x$: $4x^{2}-4x-15=0$
4. Solve the following pair of simultaneous inequalities: $2\left(3-x\right)\leq 10$ and $3(2x-5)\leq 21$
5. Show that points P(1, 2), Q(0, -1), and R(-2, -7) are collinear.
6. 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.
7. Given that $f\left(x\right)= x^{2}+x$ and $g\left(x\right)=x-2$, find the value of $x$ for which $\left(gof\right)\left(x\right)=10.$
8. Suppose$ y$ varies directly with $x,$ and $x=27$ when $y=-51.$ Find $x$ when $y=-17.$
9. Calculate: $\frac{2}{5+2\sqrt{2}}- \frac{2}{5- 2\sqrt{2}}$.
10. Given that $\frac{x}{3}= \frac{y}{5}$ and $3x+2y=38$, find $x$ and $y$.

 **SECTION B**

1. Given that triangle ABC has coordinates A(4, 5), B(6, 1), C(1, 1), plot a triangle ABC in Cartesian plane.

b) Find A’B’C’ the image of ABC under reflection on line $x=-1$ and plot it.

c) Find A”B”C” the image of ABC under central symmetry about point A.

d) Find A”’B”’C”’ the image of ABC under translation vector $\vec{v}=\left(\begin{array}{c}-1\\-1\end{array}\right)$ and plot it.

e) Find PQR the image of ABC under rotation of 2700 clockwise about origin.

d) Calculate the perimeter of triangle ABC.

1. Given that $f\left(x\right)=2x^{2}-3x+6$ and $g\left(x\right)=3x+4$ find:

a) $(fog)(x)$

b) $(fog)(-1)$

c) g-1(2)

1. *The table below gives the marks of 50 students in a test.*

*35 51 83 60 61 73 44 90 70 93 56 34 52 61 43 57 40 58 88 64 52 71 25 86 79 35 73 44 71 95 63 53 48 78 65 98 28 72 67 82 46 54 62 35 70 41 63 73 50 68.*

*a) Group the values into classes of width 10, starting from [21-30] and make the frequency table.*

*b) Find the mean.*

*c) Find the modal class and its limits.*

*d) Calculate mode.*

1. Solve the following simultaneous inequalities by shading the unwanted region:

$\left\{\begin{array}{c}y\geq -2x+4\\x>-3\\y\geq 1\end{array}\right.$ **/10marks**