

ZAMANI COLLEGE, KADUNA
ASSIGNMENT
SS 3 GENERAL MATHEMATICS

SEPT. 2014

INSTRUCTION: ANSWER ALL THE QUESTIONS.

WEEK ONE:

1. (a) Solve the equation: (i) $3^{2x} - 30(3^x) + 81 = 0$ (ii) $4^{2x} - 4^{x+1} + 2 = 0$
(b) Given that $\log_3 5 = 1.4650$, evaluate without using tables $\log_3 25 + \log_3 15$
(c) Without using tables evaluate $\frac{2}{3} \log 64 + 4 \log 3 + \frac{1}{3} \log 27 + 3 \log\left(\frac{5}{3}\right) - \log 18 - 3 \log 10$
2. (a) Find the value of k given that $\log k - \log(k - 2) = \log 5$
(b) If $8^{\frac{x}{2}} = 2^{\frac{3}{8}} \div 4^{\frac{3}{4}}$ find x .
(c) Use logarithm tables to evaluate $\frac{3.68^2 \times 6.705}{\sqrt{0.3581}}$
3. (a) Two sectors P and Q from two different circles have equal sectorial angles. The area of P is 4 times the area of Q. If the radius of Q is 6cm; what is the radius of P.
(b) A hollow sphere has a volume of $k\text{cm}^3$ and a surface area of $K\text{cm}^2$. Calculate the diameter of the sphere and hence find the value of K .
(c) Find the volume and the total surface area of a solid hemisphere of radius 9cm ($\pi = \frac{22}{7}$)
4. (a) Find the length of a diagonal of a square whose area is 288cm^2 .
(b) Evaluate without using calculator $5^x = 6$ and hence find the value of $\log_5 216$
(c) Given that $\log 2 = 0.3010$, find $\log 25$ without using calculator or tables.
5. (a) Convert the following base two numbers to base ten
(i) 101011.111_2 (ii) 100011.101_2
(b) Convert the following base ten numbers to base two:
(c) Evaluate: (i) $24_5 \times 22_5$ (ii) $24_5 + 22_5$ (iii) $101011_2 \times 111_2$

WEEK TWO: FROM 15/09/2014 TO 19/09/2014

6. Prepare addition, subtraction and multiplication tables mod 6
Hint: using the set $\{0, 1, 2, 3, 4, 5\}$
7. (a) Solve the following equations mode 5: (i) $3x+1=3$ (ii) $4x-1=0$ (iii) $3x-3=5$
(b) Solve the following equations: (i) $5x = 135x^{-\frac{1}{2}}$ (ii) $4^{c-1} = 128$ (iii) $9^{x-1} = 27$

8. (a) Evaluate: (i) $0.027^{-\frac{1}{3}}$ (ii) $(\frac{54}{16})^{-\frac{2}{3}}$ (iii) $(2x)^{\frac{1}{2}} \times (2x^3)^{\frac{3}{2}}$
- (b) Find the interior angles of a regular polygon which has (i) 12sides (ii) 20sides
- (c) Four angles of a hexagon are equal and the sum of the remaining angles is 120° . Find the equal angles.
9. (a) Construct a table of values for the relation $y = 2 + x - x^2$ for the intervals $-2 \leq x \leq 3$
- (b) Using a scale of 2cm to 1unit on both axes, draw a graph of the relation $y = 2 + x - x^2$
- (c) From your graph determine the greatest value of y and the corresponding value of x at which this occurs.

WEEK THREE: FROM 22/09/2014 TO 26/09/2014

10. (a) Using a ruler and pair of compasses only, construct:
 (i) triangle ABC such that $\angle ABC = 60^\circ$, $\angle BAC = 30^\circ$ and $AB = 10\text{cm}$.
 (ii) the locus L_1 of points equidistance from A and B
 (iii) the locus L_2 of points equidistance from line AB and Bc
 (iv) mark the intersection of L_1 and L_2 by N and measure NA.
11. The table below shows the pocket monies of 25 boarding students of a certain school in a particular day.

Pocket Monies in N	100	200	300	400	500	600
Number of Students	3	4	2	6	7	3

- (a) State the modal and median of the distribution
- (b) Calculate the mean and mean deviation of the distribution.
12. (a) Expand $(2n - 5)(6 - 5n)$.
 (b) Factorize $m^2 + 4mn - 21n^2$.
 (c) Solve the equation $12y^2 + y = 35$.
13. (a) Solve the equation $\sin \theta = \cos(\theta + 20^\circ)$
 (b) Deduce the equation whose roots are $-\frac{2}{3}$ and $\frac{3}{5}$
 (c) Given that $\tan x = \frac{5}{12}$, find the value of $\frac{2 \sin \theta + \cos \theta}{\cos \theta(1 + \cos \theta)}$

WEEK FOUR: FROM 29/09/2014 TO 06/10/2014

14. (a) Draw the graph of the function $y = 3\sin x + 2\cos x$ for values 0° to 360° at intervals of 30° .
 (b) Use your graph to estimate, correct to the nearest degree, the value of x for which:
 (i) $3\sin x + 2\cos x = 0$ (ii) $60^\circ(3\sin x + 2\cos x) - x = 0$
15. The table below shows the frequency distribution of marks scored by some candidates in an examination.

Marks	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99
Frequency	2	5	8	18	20	15	5	4	2	1

- (a) Draw a histogram for the distribution and use your graph to estimate the mode.

(b) Calculate the mean and the median of the distribution.

16. (a) Copy and complete table below is for the relation $y = 2x^2 + x - 2$

X	-3	-2	-1	0	1	2
Y	13			-2		

(b) Using any convenience scales, draw the graph of y in the interval $-3 \leq x \leq 2$

(c) From your graph, find the least value of y and the value of x for which this occurs.

(d) Using the same scale and axes, draw the graph of $y = 4 - 3x$

(e) Use your graph to solve the equation $2x^2 + 4x - 6 = 0$

17. (a) Use mathematical tables to evaluate the following: $\sqrt{\left(\frac{1872 \times 8.531}{79.21 \times 2876}\right)^3}$

(b) Without using mathematical tables or calculator, simplify:

$$\sqrt[3]{\frac{6.4 \times 10^{-5}}{1.25 \times 10^5}}$$
 leaving your answer in standard form.

(c) If $9^{1-x} = 81^x$ and $x + y = 1$, find the value of $x - y$.

18. (a) The area of circle PQR with centre O is 154cm^2 . What is the radius of the circle and the area of sector POQ if $\angle POQ = 75^\circ$.

(b) The minute-hand of a clock is 6cm long. How far does the end of the hand travel in 55 minutes?

19. A right pyramid on a base 10m square is 15m high.

(a) Find the volume of the pyramid.

(b) If the top 6m of the pyramid are removed, what is the volume of the remaining frustum?