ONLINE REVISION 2020

MATHEMATICS

TUESDAY 8TH SEPTEMBER, 2020

17. (a) Given $A = \begin{pmatrix} 5 & 1 \\ 2 & 2 \end{pmatrix}$ find A^{-1}

(b) Omolo bought 5 bags of maize and 1 bag of beans for Sh. 14000. If Omolo bought 3 bags of maize less and twice the bags of beans, he would have saved two thousand shillings. If x represents the price of a bag of maize and y represents he price of a bag of beans.

(i) Form matrix equation to represent the information above. (1 Mark)

(ii) Find the price of a bag of maize and a bag of beans using equation (i) above. (4 Marks)

(c) Find the distance of the point of intersection of the lines $5x + y = 14$ and $2y + 2x = 12$ from the point (11,-2) (3 Marks)

18. (a) Complete the table below giving your values correct to 1 decimal place $-180^0 \leq x 360^0$. (2 Marks)

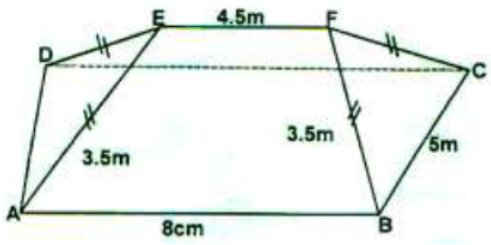
x	-180^0	-150^0	-90^0	-30^0	0^0	30^0	90^0	150^0	180^0	210^0	270^0	330^0	360^0
$y = \text{Sin } x$		-0.5		-0.5		0.5		0.5		-0.5			
$y = -\text{Sin } x$			2				-2				2		0

(b) Using the grid provided, draw on the same axis the graphs of $y = \text{Sin } x$ and $y = -2\text{Sin } x$ (4 Marks)

(c) Use your graph in (b) above to solve the equation $\text{Sin } x + 2 \text{ Sin } x = 0$ (2 Marks)

(d) What transformation maps $y = \text{sin } x$ onto $y = -2 \text{ Sin } x$ in (b) above. (2 Marks)

19. The figure below shows a shape of a roof with horizontal rectangular ABCD. The ridge EF is also horizontal. The measurements of the roof are AB = 8cm, BC = 5cm, EF = 4.5cm and EA = ED = FB = FC = 3.5cm.



Calculate

(i) the length of the ridge EF above the base ABCD (4 Marks)

(ii) the angle between the face AED and the base ABCD (3 Marks)

(iii) the angle between the face ABFE and the base ABCD (3 Marks)

20. For an in-service course in Mathematics, at least four but not more than nine teachers are to be chosen. The ratio of the number of male teachers to the number of female must be less than 2:1 and there must be more males than females.
If x and y represent the number of male teachers and female respectively.
(a) Write down the inequalities which x and y must satisfy. (4 Marks)
(b) Plot the inequalities in (a) above in the grid provided.
(c) Use your graph in (b) above to find composition of the in-service group of:-
(i) the largest size (1 Mark)
(ii) the smallest size (1 Mark)

21. The table below shows month income tax rates for the year 2003

Monthly taxable income in KSh.	Tax rates %
1-9680	10
9681-18800	15
18801-27920	20
27921 – 37040	25
Over 37040	30

The PAYE of Ole Shege in 2003 was Sh. 5079. Ole Shege's earnings include a basic salary, house allowance of KSh. 120,000, a medical allowance of KSh. 2,880 and commuter allowance of KSH. 340. He was entitled to a monthly tax relief of KSh. 1056. Calculate:
(i) Ole Shege's gross tax (1 Mark)
(ii) his basic salary (6 Marks_
(iii) Ole Shege's net salary if he deducted the following amount from his payslip: (3 Marks)
- NHIF KSh. 320
- Cooperative loan KSh. 2050

22. A bag contains 7 red balls and 5 green balls. A ball is drawn at random three times.
(a) Calculate the probability of drawing three red balls if:
(i) the ball is replaced after each draw. (3 Marks)
(ii) the ball is not replaced after each draw (3 Marks)
(b) Calculate the probability of drawing at least two red balls when the ball is not replaced after each draw. (4 Marks)

23. (a) The gradient function of a curve is given by $\frac{dy}{dx} = 2x^2 - 5$ (5 Marks)
Find the equation of the curve, given that $y = 3$ and $x = 2$
(c) The velocity, Vm/s of a moving particle after t seconds is given by $V = 2t^3 + t^2 - 1$. Find the exact distance covered by the particle in the interval $1 \leq t \leq 3$ (5 Marks)

24. Using ruler and a pair of compasses only, construct a triangle ABC such that $\angle ABC = 37\frac{1}{2}^0$, BC = 8cm and AC = 6cm. Locate a point X in the triangle ABC such that X is equidistant from A, B and C. Measure AX, AB and $\angle AXC$. (10 Marks)