UNEB UACE SUBSIDIARY MATHS 2018

PAPER 1
SECTION A

1. The roots of the equation $4x2 + 9x - k = 0$ are # and 2. Find the values of # and k.

2. A random variable X has a probability distribution given by

$$P(X=x) = \begin{cases} \frac{x}{10}, & \\ 0, & \end{cases}$$ *x*= 1,2,3 elsewhere

Calculate:
a) $P\ (1\ \#\ X<3)$.
b) the mean of X, $E(X)$.

3. Show that $\frac{1-\cos^2\theta}{\sec^2\theta-1} = \cos^2\theta$. Hence, solve the equation $\frac{1-\cos^2\theta}{\sec^2\theta-1} = \frac{3}{4}$ for $0^0\#\ \#\ \#\ 90^0$

4. Events A and B are such that

$$= P(A)\frac{6}{13}, P(B) = \frac{2}{5} \text{ and } P\left(\frac{A}{B}\right) = \frac{1}{4}$$

Find:
a) P(A#B)
b) P(A#B)

5. Express $\frac{4}{\sqrt{3}+\sqrt{2}} + \frac{4}{\sqrt{3}-\sqrt{2}}$ in the form b#c where b and c are integers.

6. The marks scored in the test by 8 students are: 5, 9, 11, 15, 19, 15, 10, 14.
Determine the:
a) mean mark
b) variance

7. Evaluate

$$\int_{-1}^{2} \frac{2x^4 - x^5}{x^2}\, dx$$

8. A force of 65N is inclined at an angle of # to the horizontal. The horizontal component of the force is 25N.
Calculate the:
a) angle #
b) vertical component of the force.

SECTION B

9. The table below shows scores by 10 students (A to J) in Physics and Mathematics tests.

Student	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
Mathematics (*x*)	28	20	40	28	21	31	36	29	33	24
Physics (*y*)	30	20	40	28	22	35	35	27	31	23

a) i) Plot a scatter diagram for the given data.
ii) Draw a line of best fit on the scatter diagram.
iii) Estimate the score in Mathematics for a student who scored 37 in Physics.

b) Calculate the rank correlation coefficient for the data and comment on your result

10. Points A,B and C have position vectors, ***2j, 4i*** and ***2i – 2j*** respectively in the ***x – y*** plane.

a) Find ***2OA + 3 OB – 4OC***

b) Determine;
i) AB and AC
ii) AB • AC
iii) angle BAC

11. A factory sells animal food in bags. The weights of the bags are normally distributed with mean weight 50kg and standard deviation 2.8kg.
a) Find the probability that the weight of any bag selected at a random;
i) is more than 52kg
ii)lies between 46 and 55kg
b) Determine the percentage of bags whose weights are less than 54kg

12. The equation of a curve is $y= 3x^2 + 2$
a) i) Determine the turning point of the curve.
ii) Find the nature of the turning point
iii) Sketch the graph of the curve.
b) The curve and the line y = 14 intersect at the points (-2, 14) and (2, 14). Calculate the area of the region enclosed between the line and the curve.

13. The table below shows the sales in thousands of copies by a local Newspaper over a period of 12 weeks.

Week	1	2	3	4	5	6	7	8	9	10	11	12
Number of copies sold	315	378	490	430	510	580	565	595	640	660	628	670

a) Calculate the 3-weeks moving averages for the copies sold
b) i) On the same axes, plot the original data and the 3 week moving averages
ii) Use your graphs to estimate the number of copies sold in the 13th week.

14. A body of mass 4kg is initially at rest at a point P whose position vector is ***(3i + 4j) m***. A constant force ***F = (8i + 4j) N*** acts on the body causing it to move. The body passes through another point Q after 4 seconds. Find the;

a) acceleration of the body.
b) velocity of the body as it passes through Q
c) kinetic energy of the body after the 4 seconds
d) distance between the points P and Q