S5 APPLIED MATHS REVISION EXERCISE

Answer **all** the questions.

1.   Find the standard deviation of the numbers 2,4,6,8,10,5,6,9,4,6.

2.   The table below shows the ages of patients recorded in a hospital on a certain day.

Ages(yrs)	1 - 10	11 - 20	21 - 30	31 - 40	41 - 50
No. of patients	6	12	30	28	4

Calculate the (i) median age (ii) mean (iii) mode (iv)standard deviation.

3.   The table below shows the marks scored by some candidates in an examination.

Marks	10 – 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79	80 - 89
Frequency	4	8	10	12	6	5	4	1

(a)   Using an assumed mean of 44.5, determine the actual mean and standard
       deviation.

(b)   Draw a Cumulative frequency curve for the data above and use it to estimate the:

       (i)   median mark   (ii)   pass mark if 30% of the candidates are to pass

       (iii)   range of marks scored by the middle 80% of the candidates.

4.   Seven students were given two separate aptitude tests and their marks are shown in the
      table below.

Test 1	40	42	84	65	76	65	60
Test 2	60	45	68	78	50	68	86

Calculate a rank correlation coefficient for the above information and comment on you
result.

5.   The table below shows the marks obtained by 11 students in Mathematics (x) and
      Ecoomics (y).

Maths(x)	50	42	64	55	86	55	60	70	75	45	60
Ecoomics(y)	60	45	68	78	50	68	86	45	50	60	68

(a) Plot a scatter diagram to represent the above information. Comment on your graph.
(b) Calculate a rank correlation coefficient to show the performance in the two subjects.
    Comment on your result.

6.   The table below shows the heights of several senior five students.

Height	177-186	187-191	192-196	197-201	202-206	207-216
Frequency	12	8	8	9	7	6

(a) Draw a histogram to show the above data and use it to estimate the modal height.
(b) Calculate the mean height and standard deviation.

7. The table below shows points scored by ten different schools in Music (x) and Drama (y) competitions.

School	A	B	C	D	E	F	G	H	I	J
Music	50	27	27	11	50	20	28	25	30	40
Drama	120	130	132	150	121	140	130	136	130	125

(a) (i) Plot a scatter diagram to represent the above information.

   (ii) Draw a line of best fit on your diagram in (a) (i). Hence estimate the number of points scored in Music by a school which scored 135 points in Drama.

(b) Calculate a rank correlation coefficient for the above scores. Comment on your result.

8. A force P of magnitude 26 N acts in the direction with unit vector $\frac{1}{13}(5\mathbf{i} + 12\mathbf{j})$ while force Q of magnitude 15 N acts in a direction parallel to the vector $4\mathbf{i} - 3\mathbf{j}$. Find the magnitude and direction of the resultant of the forces P and Q.

9. Forces of $-4\mathbf{i} + 7\mathbf{j}$, $8\mathbf{j}$ and $13\mathbf{i} - 4\mathbf{j}$ N act at a point on a particle. Find the magnitude and direction of the resultant of the force.

10. The table below shows results of 120students who sat for an examination.

Marks	5 – 10	10 – 25	25 – 30	30 – 40	40 - 50	50 – 65
Frequency	7	30	20	20	28	15

Calculate the (i) mode   (ii) 80th percentile.

11. The table below shows the UACE results of some six students in a certain A-level school.

Mathematics	A	O	B	F	E	C
Physics	C	B	A	O	O	B

Calculate the rank correlation coefficient for the grades and comment on

your results.

12. Forces of magnitude 100N, 40 N, 50 N and 60 N act on a particle in the directions 045^0, 090^0, 120^0 *and* 235^0 respectively. Calculate the magnitude and direction of the resultant force.

13. ABC is an equilateral triangle. Forces of 84 N, 35 N and 50 N act along the sides AB,

BC and CA respectively of the triangle.

(i) Find the magnitude and direction of the resultant force.

(ii)   If a fourth force of magnitude 60 N acts from A through the mid-point of BC,

find the magnitude of the system of the four forces.

14.   Forces of magnitude $2, 6\sqrt{3}, 4, 8\sqrt{3}, and\ 4$ act at A in the directions $\vec{AB}, \vec{AC}, \vec{AD}, \vec{AE}$

and $\vec{AF}$ respectively where ABCDEF is a regular hexagon. Determine the magnitude and direction of the resultant force.

15.   Forces of magnitude 4 N, s N, t N, 1 N , 7 N and 3 N act along the sides AB, BC, CD, DE, EF and FA respectively of a regular hexagon ABCDEF. Their directions are in the order of the letters.

Given that the resultant of these forces is of magnitude $2\sqrt{3}\ N$ acting in a direction perpendicular to BC, show that $s = 2$ and $t = 10$.

16.   ABCD is a trapezium in which AB = 7m, AD = DC = 3m. Forces of 30 N, 50 N, 30 N, 20 N and $20\sqrt{2}\ N$ act along AB, BC, CD, DA and AC respectively, their directions being represented by the order of the letters. Taking AB and AD as the horizontal and vertical respectively, find the magnitude and inclination of the resultant force to AD.

17.   A triangle ABC is equilateral and M is the mid-point of BC. The forces of magnitude 40 N, 30 N and 20 N act along BA, MA and CA respectively, their directions being indicated by the order of the letters. Calculate the magnitude and direction of the resultant of the forces.