End of term one exams 2018

Mathematics paper one

Time $2\frac{1}{4}$ hrs

Answer all questions in section a and not more than five questions in section b

SECTION A (40 marks)

1. The operation **p*q** means $\frac{p^2+q^2}{2p}$. Find the value of
   (i) 3*2
   (ii) **-1*(3*2)**
2. Solve the simultaneous equations

$$3x + 2y = 3150$$
$$2x + 2y = 2850$$

3. Given that $a = -2, b = 4, c = 5$ find the value of $\frac{ab^2-abc}{2}$

4. (a) Simplify $\sqrt{300} + \sqrt{192} - \sqrt{75}$ in the form $a\sqrt{b}$.
   (b) Express $\frac{1+2\sqrt{2}}{1-2\sqrt{2}}$ in the form $a + b\sqrt{c}$.

5. If $f(x) = x^2 + 1$ and $g(x) = x - 1$. Find the value of a such that $gf(a) = fg(a)$
6. Solve for x in $\frac{x-3}{5} - \frac{x}{2} = \frac{x+2}{3} - \frac{1}{3}$
7. Use factors to evaluate :$617 \times 793 + 786 \times 793 + 597 \times 793$
8. Given that $A = \begin{pmatrix} 2 & 3 \\ 5 & 7 \end{pmatrix}$, find a matrix B such that $A + B = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

9. The table below shows the number of goals scored by a team in a series of foot ball matches.

No of goals	1	2	3	4	5
	3	4	1	x	2

If the mean of the goals is 3, find x

10. Find the lowest common multiple(LCM) and highest common factor(HCF) 54 and 84

SECTION B

11. A patrol boat left Port Bell and headed South-East at a speed of 40km-1. . After 45 minutes the boat changed the course and travelled West at 50km-1 for one hour and 12 minutes.

(i) By means of scale drawing find the distance and the bearing of the boat's final position from port Bell

(ii)If the boat left Port Bell at 11:00am estimate the time when it reached a point due south of Port Bell

12. A Group of 55 students were asked if they like the food; matoke(M), posho(P), or rice(R).19 liked matoke(K), 24 like posho and 25 like rice.3 liked rice and matoke only.2 liked posho and rice only. None of the students liked matoke and posho only. Four students disliked all the foods.

(a) represent the information on a venn diagram (03 marks)

(b) find the number of students who liked;

(i) all the three foods.

(ii) matoke only

(iii) Posho only

(iv) Rice only

13. Two hundred candidates sat for an examination and their results were published as follows

Marks	Frequency
0 – 9	7
10 – 19	9
20 – 29	20
30 – 39	26
40 – 49	40
50 – 59	46
60 – 69	28
70 – 79	15
80 – 89	6
90- 99	3

Plot a cumulative frequency curve and use it to estimate the lower quartile and the upper quartile and hence find the semi inter quartile range..

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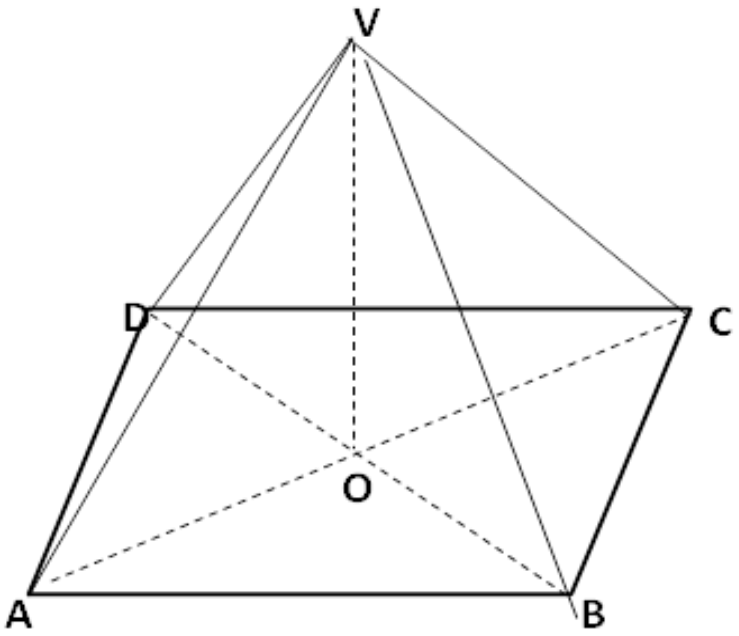


If the height if the pyramid above is 10cm. find;

i) **AV**

ii) The angle between the plane **ABCD** and **VAB**

iii) The volume of the pyramid

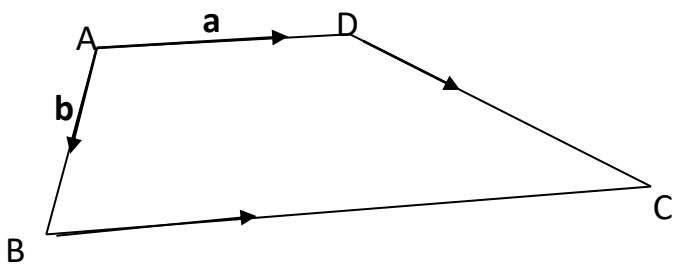
15. (a) The lines $\boldsymbol{ax + 2y = 3\ and\ ax - by = 5}$ intersect at **(1, 2)**

Find a and b.

(b) If $\begin{pmatrix} \mathbf{4} & \mathbf{1} \\ \boldsymbol{x} & \mathbf{-1} \end{pmatrix} \begin{pmatrix} \boldsymbol{x} \\ \boldsymbol{y} \end{pmatrix} = \begin{pmatrix} \mathbf{4} \\ \mathbf{8} \end{pmatrix}$, determine the values of x and y

. The diagram below shows a trapezium ABCD in which AD: BC = 2: 3

$\overline{\mathrm{AD}} = \mathrm{a}$ and $\overline{\mathrm{AB}}$



(a) Express the following vectors in form of ***a*** and ***b***

(i) $\overline{BC}$ (ii) $\overline{BD}$ (iii) $\overline{AC}$

(b) If $(-5,-3), \mathrm{D}(-1,3)$ and $\overline{\mathrm{AB}} = \begin{pmatrix} 4 \\ -2 \end{pmatrix}$, determine the

(i) Column vector $\overline{AD}$

(ii) Length of $\overline{BD}$

17. Two taxis A and B move off from rest in the same direction on a straight road.

The speed of taxi A increases at a uniform rate of 2m/s while taxi B moves as shown in the table below:

Time (s)	0	1	2	3	4	5	6	7	8
Speed (m/s)	0	0.5	1.5	4	10	15	18	19.5	20

(a) Draw on the same axis the speed time graphs of taxi A and B using the scale of 1cm to represent 1 second on the x- axis and 1cm to represent 2m/s on the y – axis

(b) Using the graphs in (a) above, find the

(i) Time and speed when taxi B overtook taxi A

(ii) Differences in the speed of the vehicles after 6 seconds

(iii) Distance covered by taxi A after 8 seconds

THE END