

ST. AGNES GIRLS' SECONDARY SCHOOL-BUSHENYI

SUBSIDIARY MATHEMATICS SEMINAR



1. The prices per unit (in Ushs) of four food stuffs A, B, C and D are shown in the table below.

Food stuff price (Ushs) in December			Weights
	2004	2005	
A	635	887.5	6
B	720	817	4
C	730	1045	3
D	362s	503	7

The weights of food stuffs A, B, C and D are 6, 4, 3 and 7 respectively. Taking 2004 as the base year, calculate for 2005 the;

- (a) Price relative for each food stuff hence the simple price index
(b) Weighted price index

(ii) Price of food stuff costing shs 500 in December 2004 using the weighted aggregate index.

Plus Two High School

2. A cyclist rides along a straight road P to Q. He passes shop P with a velocity of 2ms^{-1} and accelerates uniformly until he attains a velocity of 12ms^{-1} at shop Q for 8s. find
- (i) The acceleration of a cyclist
(ii) Distance PQ

ST. Cecilia Girls'

3. Integrate the following with respect to x .

(i) $(x-1)(x^2-1)$

(ii) $\frac{(x+1)(x-2)}{x}$

(b) Find (i) $\int_1^2 \left(\frac{1}{x} - \frac{1}{x^3} \right) dx$

(c) Given that the curve $y=3x^2-x^3$

Bassajabalaba SS

Determine the;

(i) Intercepts.

(ii) Nature of the turning points and sketch the curve.

(iii) Area enclosed between the curve and the x -axis from $x=0$ to $x=3$.

Sacred Heart Mushanga

4. If θ is reflex and α is acute, and that $\tan \theta = 7/24$ and $\cos \alpha = 8/17$, evaluate

(i) $\cos(\alpha + \theta)$

(ii) $\tan(\alpha + \theta)$

Kyeizooba Girls' School

5. Events A and B are such that $P(A \cap B) = 0.3$ and $P(A \cup B) = 0.8$, $P(A \cap B) = 0.2$

Find:

(i) $P(B)$

(ii) $P(A \cap B)$

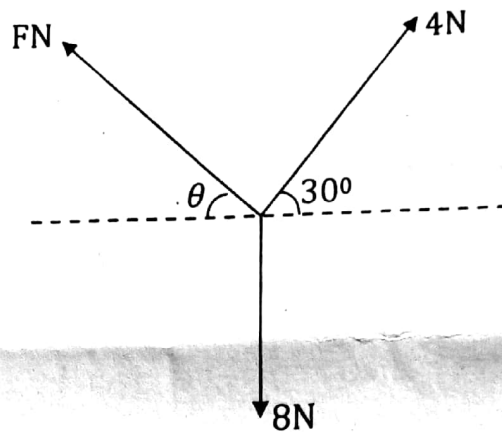
(iii) $P(A)$

(iv) Show whether A and B are mutually exclusive or independent events.

Ruyonza School

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6. (a) The diagram below shows three forces FN, 4N and 8N acting on a particle.



If the forces are in equilibrium, find the value of

- (i) θ
- (ii) F

St. Marys' Sec School Mbarara

- (c) A body A rests on a smooth horizontal table. Two bodies of mass 2kg and 10kg hanging freely are attached at A by strings which pass over smooth pulleys at the edges of the table. The strings are taut, when the system is released from rest it accelerates at 2ms^{-2} .

Find the mass of A

St. Kagwa High School

7. A car of mass 900kg is driven along a level road against a constant resistance to motion of 300N. With the engine of the car working at steady rate of 12kw, find
- (i) The acceleration of the car when its speed is 4ms^{-1}
 - (ii) The maximum speed of the car.

Vine High School

8. A particle is projected vertically upwards with a speed 5ms^{-1} . Find
- (i) Time taken to reach the maximum height
 - (ii) The maximum height attained

St. Charles Lwanga Kitabi

9. A continuous random variable x has a probability density function $f(x)$ given by

$$f(x) = \begin{cases} cx: & -0 < x < 1 \\ c(4-x): & 1 < x < 3 \\ 0: & \text{otherwise} \end{cases}$$

Calculate the:

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- (a) Value of c
- (b) Mean of x
- (c) Standard deviation of x

Kyamuhunga SS

10. Show that the equations $15 \cos^2 Q = 13 + \sin Q$ written as a quadratic equation in sine. Hence solve the equation giving all values of Q such that $0^\circ \leq Q \leq 360^\circ$.

Crane High School

11. (a) Find the gradient of the curve $y = \frac{x+5}{x}$ at $(-1, -4)$

(b) A particle moves along a straight line from a point O so that its displacement x metres from O at time t is given by $x = 24t - 18t^2 + 4t^3$

(i) Find the velocity of the particle at $t = 2$

(ii) Find the acceleration of the particle when $t = 2$, comment on the value obtained.

(iii) Find the time when its acceleration is zero.

ST. Jude Voc School

12. (A) A random variable x has the probability distribution as shown in the table below.

X	1	2	3	4	5
P(x)=x	0.1	0.3	a	0.2	0.05

Find:

(i) The value of a

(ii) $P(x \geq 4)$

(iii) $P(2 \leq x \leq 4)$

Ijumo Progressive

(b) The continuous random variable x has a pdf

$$f(x) = kx^2 \text{ for } 0 \leq x \leq 2$$

Find the

(i) Value of the constant K

(ii) $P(x \geq 1)$

St. Thomas Voc Rubirizi

13. Solve the equation $1 + \cos \theta = 2 \sin^2 \theta$ for values of θ between 0° and 360° .

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14. Show that $\frac{1-\cos^2\theta}{\sec^2\theta-1} = \cos^2\theta$

Hence solve the equation $\frac{1-\cos^2\theta}{\sec^2\theta-1} = 3/4$ for $0^\circ \leq \theta \leq 90^\circ$.

St. Josephs Voc Mbarara

15. 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 random.

(i) Is more than 52kg

(ii) Lies between 46 and 55kg

(b) Determine the percentage of bags whose weights are less than 54kg.

Kichwamba High School

16. A body of 4kg is initially at rest at a point P whose position vector is $(3\mathbf{i}+4\mathbf{j})\text{m}$.

a constant force $\mathbf{f}=(8\mathbf{i}+4\mathbf{j})\text{N}$ 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

Mbarara High School

17. Given that $\mathbf{a}=3\mathbf{i}-4\mathbf{j}$, $\mathbf{b}=-5\mathbf{i}+12\mathbf{j}$. find

(i) $(3\mathbf{a}+\mathbf{b}) \cdot \mathbf{b}$

(ii) Angle between \mathbf{a} and \mathbf{b}

Bishop Maclister Kyogyera

18. A discrete random variable x has a probability density function.

$$P(x=x) = \begin{cases} \frac{a}{2^x}, & x = 1, 2, \dots, 4 \\ 0 & \text{elsewhere} \end{cases}$$

Determine the

(i) Expectation x

(ii) Variance and standard deviation of x

(iii) Probability of $p(x \leq 3)$

Nyabubare SS

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19. The table below shows the prices and quantities of some commodities A, B, C and D for the years 2011 and 2012.

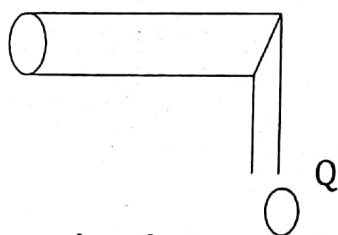
Item	Price per unit(shs)		Quantities	
	2011	2012	2011	2012
A	100	120	36	42
B	110	100	69	88
C	50	65	10	12
D	80	85	11	10

Using 2011 as base year

- Calculate the prices index number for each item for 2012
- Calculate the simple aggregate price index number for 2012
- Calculate the weighted aggregate price index number for 2012
- Calculate value index number

Bishop Ogez High School

20. Take $g=10\text{ms}^{-2}$ in this question. The diagram shows particle P of mass 0.5kg on a smooth, horizontal table. P is connected to another particle Q, of mass 1.5kg by a taut light inextensible string which passes over a small fixed smooth pulley at the edge of the table, Q hanging vertically below the pulley. A horizontal force of magnitude $x\text{N}$ acts on P as shown.



- Given that the system is in equilibrium find x
- Given that $x=12$, find the distance travelled by Q in the first two seconds of its motion following the release of the system from rest. You may assume that P does not reach the pulley in this time.

Kyeitembe Voc School

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21.(a) Use the matrix method to solve the simultaneous equations

$$4x+2y=6$$

$$3x+5y=5$$

(b) Express $\frac{2\sqrt{3}+5\sqrt{2}}{\sqrt{3}-\sqrt{2}}$ in the form $A+B\sqrt{C}$ hence state the values of A, B and C

Maria Girls'

(c) Show that $(x-2)$ is a factor of the polynomial $6x^3-5x^2-17x+6$. Find the other factors of the polynomial, hence solve $6x^3-5x^2-17x+6=0$.

Mother Mary Girls' School

22.(a) Solve the equation $x(x+5)=6$

(b)(i) Determine the value of a in the polynomial $p(x)=x^4-ax^3+ax-4$ for which $(x+2)$ is a factor of $p(x)$.

(ii) Find the remainder when the polynomial $p(x)$ is divided by $(x-2)$

Ntare School

23. The equation of 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.

Kitabi Seminary

24. Find the particular solution of the differential equation $\frac{dy}{dx} = \frac{3x^2+2x-3}{3y^2-4y}$, given that $y(1)=2$. Hence find the value of y when $x= \frac{1}{2}$.

Kashaka Girls' SS

25.(a) Given that $x \sim B(n, 0.3)$. find the least possible value of n. such that $p(x \geq 1)=0.8$

(b) The probability of winning a game is $\frac{4}{5}$. Ten games are played. What is the probability of winning at least five matches?

Bweranyangi Girls' SS

26.(a) A committee of four people is to be selected from six women and three men. In how many ways can this committee be chosen if there was to be at least a lady on the committee?

(b) In how many different ways can the letters of the word MISCELLANEOUS be arranged if the E's cannot come together.

ST. Marys' Voc School Kyamuhunga

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27.(a) Without using tables or calculators evaluate $\log_2 625 \times \log_5 32$

Timbitwire Girls' School

(b) Solve the simultaneous equations

$$\log_3 a + \log_3 b = 4$$

$$3\log_a b = 1$$

Kitagata Sec School

28. In the rectangle ABCD, AB=4cm and BC=3cm. forces of magnitude 3N, 10N, 4N and 5N act in the directions of the letters AB, BC, CD, DA and AC respectively. Taking AB as horizontal find the magnitude of resultant force.

St. Agnes Girls' Sec School

29. The ninth term of an A.P is greater than the fifth term by 6. The sum of the first twelve terms is 123. Find the

(a) The common difference of the A.P

(b) First term of the A.P

Ishaka Victory

END

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