GORO PREPARATORY SCHOOL 2012 E.C. MATHEMATICS WORK SHEET FOR GRADE 12

PART I: DIFFERENT QUESTIONS FROM GRADE 11MATHEMATICS

DIRECTION: ALL OF THESE QUESTIONS ARE FROM THE TWO GRADE LEVELS AND MULTIPLE CHOICES; SO SOLVE THE QUESTIONS USING DEFINITIONS AND RULES ON YOUR TEXT BOOK, CHOOSE THE CORRECT ANSWER FROM THE GIVEN ALTERNATIVES AND PREPARE YOUSELF FOR 2012 E.C. EUEE.

UNIT ONE

FURTHER ON RELATIONS AND FUNCTIONS

1. Which of the following function is power function?

   A. $f(x) = x^x$ B. $f(x) = 2^x$ C. $f(x) = 4x^{-3/4}$ D. $f(x) = (6x+1)^6$

2. Let $f(x) = \frac{1}{\sqrt{|x|-x}}$, the domain of f(x) = _____.

   A. $R/\{0\}$ B. R C. R^{-1} D. R^{+1}

3. Which of the following is a one to one correspondence function?

   A. f:[0, ∞¿→[0, ∞¿defined by f(x) = |x - 1| C. f:$R \to R$ defined by $f(x) = e^x$

   B. f:[1, ∞¿→[0, ∞¿defined by $f(x) = (x-1)^2$ D. f:[1, ∞¿→[0, ∞¿defined by $f(x) = (x-1)^2+1$

4. Which of the following is rational expression?

   A. $\frac{\log_2 16+3x^2}{8}$ B. $\frac{3x^2+81}{9x}$ C. $\frac{\sqrt{x^2}}{x+1}$ D. $6x^{-2}+5^x$

5. Let $f(x) = \frac{x}{x+2}$, $g(x) = \sqrt{x-2}$, and assume that b = a + 1,then the value of f(a-1) + g(a+1)

   A. $\frac{b-b\sqrt{b}-2}{b}$ B. $\frac{b+b\sqrt{b}-2}{b}$ C. $\frac{b-b\sqrt{b}+2}{b}$ D. $\frac{b+b\sqrt{b}+2}{b}$

UNIT TWO

RATIONAL EXPRESSIONS, FUNCTIONS AND EQUATIONS

1. In the decomposition of $\frac{x^2+x+1}{(x-2)(x^2+1)}$ the partial fraction is:

A. $\frac{2}{5(x-2)}+\frac{3x+1}{5(x^2+1)}$ C. $\frac{7}{5(x-2)}+\frac{2x+1}{5(x^2+1)}$

B. $\frac{3}{2(x-2)}-\frac{2x+1}{2(x^2+1)}$ D. $\frac{3}{2(x-2)}+\frac{2x+1}{2(x^2+1)}$

2. The solution set of the equation $\frac{x}{x+1}+\frac{1}{x}+\frac{2x+1}{x^2+¿x}=0$ is_____

A. $R/\{-1\}$ B. {-2} C. {-1, -2} D. {-1}

3. Which one is not true about a rational function f(x) = $\frac{x^3+2x-3}{x-2}$?

A. has oblique asymptote at y =x+4 B. has no horizontal asymptote

C. has vertical asymptote at x = 2 D. y-intercept at y =3/2

4. What is the solution set of $\frac{2x+5}{x-1}\geq 2$?

A. (1, ∞) B. [1, ∞) C. {1, -5/2} D. (-∞, 0)

5. Which one is not true about a rational function f(x) = $\frac{x^3+2x-3}{x-2}$?

A. has oblique asymptote at y =x+4 B. has no horizontal asymptote

C. has vertical asymptote at x = 2 D. y-intercept at y =3/2

UNIT THREE

COORDINATE GEOMETRY

1. If line 5x + By -6 = 0 is perpendicular to the line 7y – 4x -1 = 0, then B is:

B. $-\frac{35}{4}$ B. $\frac{20}{7}$ C. $-\frac{4}{35}$ D. $\frac{7}{20}$

2. Which of the following is equation of a circle with center at (2,4) that passes through the point(5,8)?

A. $(x+2)^2+(y-4)^2=25$ C. $(x-2)^2+(y+4)^2=25$

B. $(x-2)^2+(y-4)^2=25$ D. $(x+2)^2+(y+4)^2=254$

3. One is the equation of directirix line to the parabola $y^2 = -16x$

A. $x = -4$ B. $x = 4$ C. $y = -4$ D. $y = 4$

4. The length of major axis of the ellipse $x^2 + 9y^2 - 2x + 18y + 1 = 0$ is

_____

A. 3 B. 6 C. 9 D. 18

5. Which of the following is equation of hyperbola with center at (2, 3); one focus at (2, 8) and length of conjugate axis 4?

A. $\frac{\frac{(x-2)^2}{9}-(y-3)^2}{16} = 1$ C. $\frac{\frac{(y-3)^2}{16}-(x-2)^2}{9} = 1$

B. $\frac{(x-2)^2}{16}-\frac{(y-3)^2}{9} = 1$ D. $\frac{\frac{(y-3)^2}{9}-(x-2)^2}{16} = 1$

UNIT FOUR

MATHEMATICAL REASONING

1. If the truth value of P is T and q is F, which of the following compound proposition has truth value F?

B. $(p \wedge q) \Leftrightarrow (q \wedge p)$ C. $(p \Rightarrow q) \Leftrightarrow (q \Rightarrow \neg p)$

C. $(\neg p \wedge \neg q) \Rightarrow \neg(p \vee q)$ D. $(\neg p \vee \neg q) \Leftrightarrow (p \wedge \neg p)$

2. Of the following one is valid logical argument?

A. $\neg p, p \vee q, r \Longrightarrow q \vdash r$

B. $\neg p \wedge \neg q, (q \vee r) \Longrightarrow p \vdash r$

C. $p \Rightarrow (q \wedge r), p \vdash \neg q$

D. $\neg p \wedge \neg q, (\neg q \Longrightarrow r) \Longrightarrow p \vdash \neg r$

3. One of the following quantifiers has truth value **T**?

A. $(\exists x)(x+2=x+3)$ C. $(\forall x)(x+1<x)$

B. $(\forall x)(x^2+1>1)$ D. $(\exists x)(x^2-1>0)$

4. Which one of the following is equivalent to $\neg[(\exists x)(P(x) \Longrightarrow Q(x))]$

A. $[(\forall x)(\neg P(x) \Longrightarrow \neg Q(x))]$

B. $[(\exists x)(\neg P(x) \Longrightarrow \neg Q(x))]$

C. $[(\forall x)(\neg P(x) \wedge \neg Q(x))]$

D. $[(\forall x)(P(x) \wedge \neg Q(x))]$

5. Contra positive of the statement "If 2 + 4 = 7, then 3 < 4".

A. If 3 < 4, then 2 + 4 = 7.
C. If 3 ≥ 4, then 2 + 4 ≠ 7.

B. If 3 ≤ 4, then 2 + 4 ≠ 7.
D. If 3 ≥ 4, then 2 + 4 = 7.

UNIT FIVE

STATISTICS AND PROBABILTY

Answer questions number 1 and 2 depending on the following data that shows students age distribution from different grade level.

Age	10 – 14	15 – 19	20 – 24	25 - 29	30 – 34
Frequency	7	6	9	2	1

1. One of the following is the median class?

A. 2^{nd} B. 3^{rd} C. 4^{th} D. 5^{th}

2. What is the value of Q_2 in the distribution?

A. 20.08 B. 22.375 C. 19.08 D. 14.2

3. If A and B are independent events such that P (A) = ½ and P (B) = $\frac{3}{4}$, then what is P (AUB)?

A. ½ B. $\frac{3}{4}$ C. $\frac{7}{8}$ D. $\frac{4}{5}$

4. If $\binom{x}{2}$ = 36, then one of the following is the value of 'x'.

A. 8 B. 9 C. 10 D. 11

5. If the coefficient of x^2 in the expansion of $(x^3 + \frac{a}{x^2})^4$ is 144, the value of 'a' is

A. 24 B. 2 C. $2\sqrt{6}$ D. $2\sqrt{2}$

UNIT SIX

MATRICES AND DETERMINANTS

1. If $\begin{pmatrix} x & -3 \\ -1 & y \end{pmatrix}$ is inverse of $\begin{pmatrix} 2 & 3 \\ 1 & 2 \end{pmatrix}$, then the values of x and y respectively?

A. 1 and 3 B. 2 and 2 C. 4 and 1 D. ½ and -3/2

2. Given that A = $\begin{pmatrix} 3 & 5 \\ 2 & 4 \end{pmatrix}$ and $B^{-1} = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$ then which of the following is $(3AB)^{-1}$?

A. $\begin{pmatrix} 5 & \frac{-3}{2} \\ -6 & \frac{9}{2} \end{pmatrix}$ B. $\begin{pmatrix} 5 & \frac{3}{2} \\ 6 & \frac{-9}{2} \end{pmatrix}$ C. $\begin{pmatrix} 5 & \frac{3}{2} \\ -6 & \frac{-9}{2} \end{pmatrix}$ D. $\begin{pmatrix} 5 & \frac{-3}{2} \\ 6 & \frac{-9}{2} \end{pmatrix}$

3. What is the solution of the following system of linear equation $\begin{cases} 2x+y=5 \\ x+3z=16 \\ 5y-z=10 \end{cases}$?

A. $\{(3,1,5)\}$ B. $\{(1,3,5)\}$ C. $\{(-3,-1,-5)\}$ D. $\{(-1,-3,-5)\}$

4. Let $A=\begin{pmatrix} -2 & x \\ y-1 & 3 \end{pmatrix}$ and $B^T=\begin{pmatrix} x+1 & 4 \\ -3 & y-2 \end{pmatrix}$, then the values of x and y respectively such that A^T+B is a diagonal matrix.

A. $-4,3$ B. $4,-4$ C. $-3,4$ D. $-4,4$

5. For what value of m the matrix A = $\begin{pmatrix} 0 & -3 & -4 \\ m & 0 & 8 \\ 4 & -8 & 0 \end{pmatrix}$ is skew symmetric matrix.

A. 3 B. -3 C. 0 D. 5

UNIT SEVEN

THE SET COMPLEX NUMBERS

1. The polar form of $Z=¿ (1+\sqrt{3}i)(1+i)$

A. $2\sqrt{2}(\cos 105+i\sin 105)$ C. $4(\cos 105+i\sin 105)$

B. $2\sqrt{2}(\cos 15+i\sin 15)$ D. $4(\cos 75+i\sin 75)$

2. If $z = (1+i)^{10}$, then which one of the following is equal to z

A. 1 +32i B. 32i C. 10i D. 1 + 10i

3. If $\left(\frac{1+i}{1-i}\right)^2+\frac{1}{x+yi}=1+i$, then what are values of x and y respectively?

A. $\frac{3}{5}$ and $\frac{-1}{5}$ B. $\frac{-2}{5}$ and $\frac{-1}{5}$ C. $\frac{2}{5}$ and $\frac{-1}{5}$ D. $\frac{2}{5}$ and $\frac{1}{5}$

4. Multiplicative inverse of z = $\frac{1}{2+3i}$ is:

A. $\frac{-2-3i}{13}$ B. $\frac{2-3i}{13}$ C. $\frac{-2-3i}{\sqrt{13}}$ D. $\frac{2-3i}{\sqrt{13}}$

5. One of the following is not the fourth root of 3 in the set of complex numbers.

A. $\sqrt{3}i$ B. $-\sqrt{3}$ C. 3 D. $-\sqrt{3}i$

UNIT EIGHT (NATURAL SCIENCE)

VECTORS AND TRANSFORMATION OF THE PLAN E

1. If $\vec{A}$is perpendicular to $\vec{B}$the n, what is the cosine of the angle between $\vec{A}$and$\vec{A}-\vec{B}$?

A. $\frac{¿\overrightarrow{B}\vee¿}{¿\vec{A}+\overrightarrow{B}\vee¿¿}¿$ B. $\frac{¿\overrightarrow{B}\vee¿}{¿\vec{A}-\overrightarrow{B}\vee¿¿}¿$ C. $\frac{¿\overrightarrow{A}\vee¿}{¿\vec{A}+\overrightarrow{B}\vee¿¿}¿$ D. $\frac{¿\overrightarrow{A}\vee¿}{¿\vec{A}-\overrightarrow{B}\vee¿¿}¿$

2. Suppose $\vec{U}$ = (3, x) and $\vec{V}$ = (x, y-2) are vectors, then what is the value of 'x' so that $\vec{U}+\vec{V}=¿\ 3\vec{U}-\frac{1}{2}\vec{V}$

A. 3 B. 5 C. 4 D.-4

3. Vector equation of a line passing through points (3, 2) and (1, -1) is:

A. (x, y) = (1, -1) + t(2, 3) C. (x, y) = (1, -1) + t(3, 2)

B. (x, y) = (3, 2) – t(2, 3) D. (x, y) = (3, 2) – t(2, 3

4. The image of the line l: y = x + 4 after it has been reflected along the line l: y = x – 3

A. y = 2x – 10 B. y = 2x +10 C. y = x- 10 D. y = x + 10

5. The image of the point $(\sqrt{3},1)$ under the rotation of $\frac{5\pi}{6}$ anticlockwise about the origin is:

A. (-2, 0) B. (4, -2) C. (-1, 2) D. (2, -3)

UNIT NINE (NATURAL SCIENCE)

FURTHER ON TRIGONOMETRIC FUNCTIONS

1. The exact value of $\cos\left(\sin^{-1}\left(\frac{3}{5}\right)+\cos^{-1}\left(\frac{-4}{5}\right)\right)$ is

A. -1 B.1 C.$\frac{1}{2}$ D.$\frac{-1}{2}$

2. Which one is true about the function $f(x)-3\cos\left(3x+\frac{3\pi}{4}\right)$?

A. The graph has maximum value at $x=\frac{\pi}{4}$ C. Its amplitude is -3

B. The graph has minimum value at $x=\frac{\pi}{12}$ D. Its range is $[-1,1]$

3. Which of the following is the solution set of $\sqrt{3}\sin 2x=\cos 2x$ on the interval $[0,\pi]$?

B. $\left\{\frac{\pi}{6},\frac{\pi}{12}\right\}$ B.$\left\{\frac{\pi}{6},\frac{\pi}{3}\right\}$ C. $\left\{\frac{\pi}{12},\frac{7\pi}{12}\right\}$ D.$\left\{\frac{\pi}{6},\frac{2\pi}{3}\right\}$

4. The simplified form of $\frac{2\tan\theta}{1+\tan^2\theta}$ is

A. $\tan 2\theta$ B. $2\sin\theta\cos\theta$ C. $\sin 2\theta$ D.$\cos\theta$

5. A School square field measures 40 m by $40\sqrt{3}$ m to get home move quickly Ayantu decides to walk along the diagonal of the field .what is the angle of Ayantu's path with respect to the 40m side?

A.90^o B.60^o C.45^o D.30^o

UNIT TEN (SOCIAL SCIENCE)

INTRODUCTION TO LINEAR PROGRAMING

1. The equation of a line passing through (-1, 2) and slope 4 is:

A. y = 4x – 7 B. y = -4x +7 C. y = 4x + 7 D. y = -4x – 7

2. The line with equation 4x + ky = 8 parallel to the x + 2y = 0, then one of the following is the value of 'k'

A. 8 B. 4 C. ¾ D. 3/16

3. The maximum value of the objective function z = 2x + 3y subject to the given constraints

$$x,y\geq 0$$
$$x-y\geq 0$$
$$2y+x\leq 16$$

A. 30 B. 24 C. 20 D. 25

4. The value of x and y that gives the minimum value of the objective function z = 4x + 2y subject to given constraints $\begin{matrix} x, y \geq 0 \\ x+2y \geq 4 \\ 3x+y \leq 7 \\ -x+y \leq 7 \end{matrix}$

A. x = 1, y = 4 B. x = 2, y = 1 C. x = 4, y = 0 D. x = 0, y = 4

5. The possible values of the point which minimizes the value of the objective function

Z= -2x+y

Subject to

x+y≤ 0

X-y≤3

y≤4

x≥0

Y≥0 are:

A. (0, 0) B. (7, 4) C. (7,0) D. (5,2)

UNIT ELEVEN (SOCIAL SCIENCE)

MATHEMATICAL APPLICATION IN BUSINESS

The following table gives the number of teachers in a given school according to their educational level and sex, then answer question 1 and 2 depending on this table.

	Diploma	Degree	Total
Male	28	24	52
Female	26	22	48
Total	54	46	100

Using this table answer questions number 26 and 27

1. The ratio of male degree holders to the total in the school is:

A. 28:100 B. 24:100 C. 52:100 D. 24:28

2. The ratio of diploma holders to degree holders in the school is:

A. 46:54 B. 54:46 C. 24:28 D. 22:26

3. Allocate birr 6000 in the ratio of 2:3:7to three students A, B, and C, then A get birr
   A. 500 B. 1500 C. 1000 D. 3500
4. A farmer has birr 1,700to by sheep and goats suppose the unit price of a sheep is birr 400 and unit price of goat is birr 200. If he has bought two sheep then what is the maximum number of goats he can buy with the remaining money?
   A. 5 B. 4 C. 10 D. 8
5. Marta bought a shoe for birr 280 and want to sell it at 24% mark up, then the mark up is:
   A. 64 B. 56.4 C. 67.2 D. 70

PART II: DIFFERENT QUESTIONS FROM GRADE 12 MATHEMATICS

UNIT ONE

SEQUENCES AND SERIES

1. What is 100^{th} term of the sequence 3, 10, 17,24,31,...?
   A. 463 B. 510 C. 696 D. 531
2. If $\{a_n\}$ is a sequence such that $a_1 = 2$,and $a_{n+1} = a_n + 4$for all $n \geq 1$, then $\sum_{n=1}^{35} a_n$ = __
   A. 2460 B. 2458 C. 2450 D. 2442
3. Which one of the following relation holds for the sequence: -10, -4, 2, 8, 14,..?
   A. $a_n = a_{n-1} - 6$ B. $a_n = a_{n-1} + 6$ C. $a_n = a_{n-1} - 7$ D. $a_n = a_{n-1} + 7$
4. What is the fourth term of a geometric sequence whose third and eighth terms are 1 and $\frac{1}{32}$ respectively.
   A. $\frac{1}{32}$ B. $\frac{1}{8}$ C. $\frac{1}{16}$ D. $\frac{1}{4}$
5. If x, 4x + 3 and 7x + 6 are consecutive terms geometric sequence, then value of 'x' is:
   A. -1 B. 1 C. 0 D. -2

UNIT TWO

INTRODUCTION TO LIMITS AND CONTINUITIES

1. Of the following one is equal to $\lim_{n\to\infty}\left(1+\frac{1}{2x}\right)^{-3x}$

   B. $e^{\frac{-3}{2}}$ B. $\frac{1}{e\sqrt{e}}$ C. e D. e^3

2. $\lim_{x\to 1}\frac{x-\sqrt{x^{2+x\ +1}}}{x-1}$ is equal to A. $\frac{1}{3}$ B. $\frac{-1}{2}$ C. 2 D. $\frac{1}{2}$

3. If $a_n = \frac{n+2}{3n-7}$, then which one of the following is not true about the sequence $\left(a_n\right)_{n=1}^{\infty}$

   A. It converges to 1/3 B. its lub is 5/2 C. its glb is -4 D. it is monotonic sequence

4. The limit of the sequence 3.5, 3.55, 3.555, 3.5555 ... as n tends to infinitive is:

   A. $\frac{5}{9}$ B. $\frac{35}{9}$ C. $\frac{32}{9}$ D. $\frac{23}{7}$

5. Let $f(x)=\begin{cases} ,if\wedge x<0 \\ ,\wedge if\ x\geq 0 \end{cases}$

   If f is continuous function, then what is the value of 'a'?

   A. -2 B. -1 C. 1 D. 2

UNIT THREE

INTRODUCTION TO DIFFERNTIAL CALCULUS

1. For what value of k the line y = -8x + k is tangent to the curve $y = 3x^2 + 4x + 1$?

   A. -11 B. -2 C. 2 D. 11

2. Let $f(x) = e^{-2x}$, what is the n^{th} derivative of the function f at x = o, for positive integer n?

   A. $(-2)^n$ B. 2^n C. -2^n D. 2^{-n}

3. If f(x) = $\ln\sqrt{x^2+1}$, then which of the following is equal to $f'(x)$

   A. $\frac{x}{\sqrt{x^2+1}}$ B. $\frac{x}{x^2+1}$ C. $\frac{2x}{\sqrt{x^2+1}}$ D. $\frac{2x}{x^2+1}$

4. If f(x) = $2x^2-3x$, then $\lim_{x\to 0}\frac{f(x)-f(1)}{x-1}$ is equal to_____.

   A. 1 B. -1 C. 7 D. ∞

5. For which smallest value of n the n^{th} derivative $f^n(x) = f(x)$ in the function f(x) = sinx.

A. 4 B. 6 C. 8 D. 10

UNIT FOUR

APPLICATION OF DIFFERNTIAL CALCULUS

1. Air is pumped in to spherical balloon at a rate of $50cm^3/se$, what is the rate of change of radius if the diameter is 5cm?

A. $\frac{1}{50\pi} cm/se$ B. $\frac{1}{25\pi} cm/se$ C. $\frac{5}{\pi} cm/se$ D. $\frac{2}{\pi} cm/se$

2. If f(x) = $x\sqrt{x+4}$ on [-4, 0] for which value(s) of c ∈ (-4, 0) that satisfy the conclusion of Roll's theorem.

A. $-\frac{8}{3}$ B. $-\frac{3}{8}$ C. $\frac{3}{8}$ D. $\frac{8}{3}$

3. Let $f(x) = x^3 - 9x^2 + 24x + 3$, then the interval in on which f is decreasing.

A. [0, 2] B. [2, 4] C. $[4, \infty)$ D. $(-\infty, 2]$ ¿ $[4, \infty)$

4. If $x^2 + xy = 10$, then what is the value of $\frac{dy}{dx}$ when x = 2?

A. $-\frac{7}{2}$ B. $\frac{2}{7}$ C. $\frac{3}{2}$ D. $\frac{7}{2}$

5. An object is moving along the parabola $Y=2\sqrt{x}$ in xy-plane at what point on its path does the object be closest to the point (5, 0)?

A. (4,4) B.(1,2) C.$(3,\sqrt{6})$ D.$(3,2\sqrt{3})$

UNIT FIVE

INTRODUCTION TO INTEGRAL CALCULUS

1. $\int \frac{x}{x+5} dx$ is:

A. $x + \ln|x+5| + C$ C. $x - 5\ln|x+5| + C$

B. $-x + 5\ln|x+5| + C$ D. $x + \ln|x+5| + C$

2. What is the value of $\int_2^9 f(x)dx$ given that $\int_5^2 f(x)dx=3 \wedge \int_5^9 f(x)dx=8$?

A. 8 B. -3 C. 6 D. 5

3. Which one of the following is equal to $\int_1^2 \frac{1}{x^2+2x}dx$?

A. $\frac{1}{2}\ln\frac{3}{2}$ B. $\frac{3}{2}\ln\frac{3}{2}$ C. $\frac{1}{2}\ln\frac{2}{3}$ D. $\frac{3}{2}\ln\frac{1}{2}$

4. Area of the region enclosed by the graph of f(x) = e^x and g(x) = x between the lines x = -1 and x = 1?

A. $\frac{e^2-1}{e}$ B. $e^2-\frac{1}{e}$ C. $e^2-\frac{1}{e}+2$ D. $e-\frac{1}{e}+2$

5. Which of the following is equal to the volume generated when the region bounded by the graph of y = $2\sqrt{x+1}$ and the x-axis, for $0 \le x \le 2$, rotates about the x-axis?

A. 8π B. $8\pi^2$ C. 16π D. $16\pi^2$

UNIT SIX (NATURAL SCIENCE)

THREE DIMENSIONAL GEOMETRY AND VECTORS IN SPACE

1. Which of the following triplet of numbers show vertices of isosceles triangle?

A. (3, -1, 7), (3, 1, 4) and (5, 4, 5)

B. (0, -1, 7), (3, -1, 1) and (3, 0, 7)

C. (2, -1, 7), (3, 1, 4) and (5, 4, 5)

D. (1, 2, 3), (3, 4, 5) and (1, 1, 1)

2. If the midpoint of a line segment is at M(2, 5, -3) and one of its end points is at R(-3, 2, 4),then the coordinate of other end point is

A. (7,8, -10) B. (6,7, -9) C. (-7,-8, -9) D. (-7,-6, -10)

3. Which one of the following points on the x-axis $\sqrt{12}$ units from the point (-1, -1, 2)

A. $(1-\sqrt{2},0,0)$ B. $(-1-\sqrt{2}, 0, 0)$ C. $(1+\sqrt{2}, 0, 0)$ D. $(-1+\sqrt{2}, 0, 0)$

4. Degree measure angle between vectors V= i + j and U = i+ k is:

A. 60 B. 30 C. 90 D. 45

5. Suppose $A=-2i+2j+k$ and B is a vector in space such that $|\vec{B}|=\vec{A}.\vec{B}$. If $\vec{u}$ is unit vector in the direction of $\vec{B}$, then $|\vec{A}+\vec{u}|^2$ is equal to:

A. 12 B. 10 C. 14 D. 16

UNIT SEVEN (NATURAL SCIENCE)

MATHEMATICAL PROOFS

1. Let Q(x, y) be open proposition "x +y = x – y". If the universal set for x and y is the set of integers, then one of the following has true truth value.

   A. Q(2, 2) B. Q(3, 0) C. (-3, -4) D. (5, 4)

2. Of the following one is used to show that for all natural number, $1^3 + 2^3 + \ldots + n^3 = \frac{n^2(n+1)^2}{4}$

   A. Direct proof B. indirect proof C. proof by mathematical induction D. proof by cases

3. Which proof is preferable to proof "If n is odd, then n^2 is odd."

   A. Direct B. Indirect C. method of case D. contradiction

4. Which one of the following is valid logical argument?

   A. $p \Longrightarrow q, \neg r \Longrightarrow p, \neg s \Longrightarrow \neg r \vdash \neg q \Longrightarrow s$

   B. $\neg p \Longrightarrow \neg r, p \Longrightarrow q, \neg q \vdash r$

   C. $p \Rightarrow (q \wedge r), p \vdash \neg q$

   D. $\neg p, p \vee q, r \Longrightarrow q \vdash r$

5. Which one of the following quantifiers has truth value **T**?

   A. $(\exists x)(x+2=x+3)$ C. $(\forall x)(x+1<x)$

   B. $(\forall x)(x^2+1>1)$ D. $(\exists x)(x^2-1>0)$

UNIT EIGHT (SOCIAL SCIENCE)

FURTHER ON STATISTICS

1. Consider the following frequency distribution table of a grouped data, where a class interval includes its lower class boundary and excludes its upper boundary. Then which of the following is true?

Value	5-15	15-25	25-35	35-40
Frequency	10	20	15	5

A. It is positively skewed C. The mode of the data is =23

B. It is negatively skewed D. The median of the data is=22.5

2. A group of 100 items have a mean of 62, if the mean of 40 of the items is 55. What is the mean of the remaining items?

   A. 69 B. 96 C. 66.67 D. 64.55

3. In a college a total of 1340 students are enrolled in the following departments ICT, AUTO, Drafting and Electricity. If the number of students enrolled in ICT is 335, 40% in Drafting &15% in Electricity, Then what percent of the total will be enrolled in AUTO department?

   A. 10 B. 20 C. 15 D. 5

4. Suppose four students out of 25 score the highest mark in a test ,then it can be defined in degree as

   A. 50^0 B. 57.6^0 C. 75.6^0 D. 57^0

5. Mean deviation about the mean of the following data is:

X	0 – 5	6 – 11	12 – 17	18 - 23	24 - 29
F	5	8	7	10	3

A. 14. 14 B. 14.2 C. 14.4 D. 14.5

UNIT NINE (SOCIAL SCIENCE)

MATHEMATICAL APPLICATION FOR BUSINESS AND CONSUMERS

1. A salvage value of a machine that costs 18,000 is Birr 300 at the end of 8 years. What is the depreciation of the machine for the fourth year?

   A. 8850 B. 15000 C. 21000 D. 2212.5

2. Which of the following is the type of investment issued by government or corporation usually known as fixed income security?

   A. Saving account C. Certificate of deposit

   B. Stock D. Bond

3. A car dealer fixed selling price of a car to be Birr 200000.In the meantime 10% tax was allotted .If the car is sold for Birr240000, then the percentage profit gained is?

   A.20 B.15 C.10 D.12

4. A washing machine that costs Birr 3100 has a service life of 20 years .If its monthly straight line deprecation is Birr 18, what is its salvage value?

   A.292 B.310 C.940 D.980

5. The price of an item after 20% reduction was 90 Birr, and then what is the original price?

   A.312.5 B.250 C.225 D.112.5

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