**MATHEMATICS ENTRANCE EXAM OF (2000 - 2012E.C)**

**GRADE 11 CHAPTER 1**

**Directions:Solve each of the following questions and choose the best answer to the problem from the given alternatives. Write the letter of your choice in capital letter**

1. Givenwhich one of the following is the domain of (*fog)*?

A. B. C. D.{ *x*> }

1. If *f* (*x*), then which of the following is equal to

A. - (*x*) B. C. D.

1. What is the value of
2. -3*x* B. 3*x* C. –*x* D. *x*
3. If and *f (a)* = 5 then*f (2a)*is equal to:

A. 2 B. 4 C. 6 D. 8

1. If *f (x)* = , which of the following is equal to *(x)* ?
2. C.
3. D.
4. Which one of the following is t he domain of *g(x)* =

A. {0} B. {-1} C. {0, 1} D. {-1,0}

7. Which of the following functions touches but never crosses the x – axis?

A.*f* (*x*) = 1 –*x* B. *f* (*x*) = *x*4 – 1 C.  *f* (*x*) = (*x*2 – 1)2 D.*f* (*x*) *= x* –*x*5

8. If x < 0, then simplest form of is equal to ?

A. 2x B. 2 C. -2 D. 0

9. If and g(x) = , then

1. B. C. D.
2. Which of the following functions is a one – to - one correspondence?
3. *f* :, *f (x)* = tan x, where is the domain of *fC. h : [0,) [0,),* h(x) =x2
4. *g* : *g(x)* =2*x*D.*r*: [0,) [0,), *r(x)* = *x*+5
5. The inverse of the function defined by *g(x)*= is equal to:
6. *(x) = -*  C.*(x)= -*
7. *(x)=*  D. *(x)=*
8. If then which of the following is the inverse of f?
9. C.
10. D.
11. Which one of the following is the domain of *g(x)* =

A. {0} B. {-1,1} C. D. {-1,0}

1. Which one of the following is a polynomial of degree 3?

A.C. B. D.

1. Which one of the following is true about the polynomial?

?

A. Its degree is 6 B. The constant term is 18 C. Coefficient of x6 is 2 D. Leading coefficient is 12

1. **Let y = . Then an expression of x in terms of y is:**
2. B. ln C. 2y D. ln2y
3. **Which of the following is the inverse of**

A. g(x)= C. g(x)=

B. g(x)= D. g(x)=

1. **Which one of the following is a one to one correspondence function**

**from A=[0, 1] to B=[1, 2]?(2008)**

1. **C.**
2. **D.**
3. **then which one of the following is true about the composition function? (2008)**
4. C.
5. D.
6. **If the point (3,-2) is on the graph of which point is on the graph of (2008)**
7. (1/3, -2) B. (3, -1) C. (-2, 3) D.(3, -1/2)
8. **If , then what is the domain of (2008)**
9. **(-2, ) B. (-1, ) C. [-2, D.**
10. **The inverse of the function (2008)**
11. C.
12. D.
13. **Which one of the following is a one to one correspondence?(2009)**
14. **If (2009)**
15. B. 2 C. D.
16. **Which one of the following is the inverse of (2009)**
17. C.
18. D.
19. Which one of the following is true about signum, absolute value and greatest integer fuctions? 2010
20. C.
21. D.
22. Let then what is 2010)
23. B. C. D.
24. vbIf -1(x+1) = each , then what must be the value of
25. B. a C.
26. If f is the greatest integer function and is the absolute value function, then what is the value of ( ?

A. 1 B. 3 C. -1 D. 2

1. Which one of the following is equal to 2

**CHAPTER 2**

1. What is the solution set of – = 1 - ?
2. { 1, -2} B.{1, 2 } C. {-1} D. {1}
3. Which one of the following functions has NO vertical asymptote?
4. *f* (*x*) = B. *f* (*x*) C. *f* (*x*) D. *f* (*x*)
5. Which one of the following is true about the graph of *f* (*x*) = ?

*A. x* = 0 and *x* = 1 are its vertical asymptote

*B. y* = 1 is its horizontal asymptote

*C. y* = *x* – 1 is its oblique asymptote

D. It is almost the same as the horizontal line y = -1 as *x*

1. What is the solution set of 1- = + ?

A. { 1, -1 } B. { 2} C. {-1} D. {1, 2, -1 }

1. Which of the equations below is represented by the following parabola?
2. y = x2 +2
3. y = (2x -1)2
4. y = 2(x-1)
5. y = (2x+1)2

2

1. Which of the following is a polynomial expression?

A. + sin x C.

B. D.

1. Which of the following is Not true about the graph of *g(x*) = ?

A. The range of g is (- ) C. *g* is an even function

B. The line *y* = 1 is a horizontal asymptote D. As *x*,

1. Which of the following is a simplifies form of

*, t*1 ?

*A. t* + 1 B. *t* -1 C. 1 – *t* D. –*t* -1

1. What are the respective values of *A,* B and *C*, so that

= + ?

A. -1, 1, 1 B. -1, 1, 2 C. 1, -2, 0 D. 3, 1, 2

1. Which of the following is a polynomial of degree 3?

A. -+ *x* C. + ( *x* -1 ) + sin ( / 4 )

B. + (1-*x*) + 1 D. + + sin (*x*) + 1

1. Which of the following is true about *f* (*x*) = *x*5 (*x*-1)4 (*x*2 + 3)?

A. 0 is a root of *f* (*x*) with the lowest multiplicity C. The graph of *f* (*x*) crosses the x-axis only at 0

B. The graph of *f* (*x*) crosses the x – axis at x = 1 D. *f* (*x*) has three distinct real roots

1. Which of the following is a simplified form of

B. C. D.

1. If , which of the following is true about

A. Its graph has an oblique asymptote. B. The graph of does not meet its asymptote

C. As x D. As x

1. If *p(x)* = *3x2*and *q(x)* = *x2 + x*, then what is the solution set of ?

A.{-1, 2} B. {2} C. { - 3, 2) D. {-3}

1. What is the solution set of the inequality

A.() B.(-) C. (-) () D.

1. What are the values of a and b which make the mathematical statement

A. a=1, b=0 B. a=1/3 b=3/5 C. a= -2/5, b= 1 D. a= -2/5, b= 1/3

1. Which of the following is NOT true about ?

A. Range of f={ y B. y=-2 is a horizontal asymptote to the graph of f

C. The graph of f has no vertical asymptote D. the graph of f is symmetric with respect to the the y- axis

1. What is the solution set of

A. (-2, 0) B. ) C. D.

1. If p(x) = x-4, q(x) = and r(x)= then which of the following is the most simplified expression of

A. C.

B. D.

1. Which of the following is true about the rational function ?

A. The domain of *f* is the set of all real numbers where q(x) is well defined and non-zero.

B. If the domain of *f* is R then f is polynomial.

C. The range of *f* is always R

D. P(x) is divisible by q(x).

1. Which of the following represents the solution set for the equation
2. {} B. {-4, 2} C. {-2} D. {}
3. The solution set of the in equality

A/ B/ C/ D/

1. Let f(x) = Then, which of the following is not true?

A/ is an even function. C/ The line x=3 is vertical asymptote of the graph of f.

B/ is the range of f. D/ The graph of f is symmetric with respect to the line x=3.

1. Suppose which of the following is equal to g(x)?

A. B. C. D.

1. Which of the following is the solution set of the inequality
2. (-1, 1) B. C.D.
3. Which of the following function could most likely be sketched as in the figure below?
4. y
5. 2 y=2
6. 1

-1 1

x= -1

1. Which of the following is a rational function?
2. C.
3. D.
4. Simplifying, gives;

A/ 1 B/ 0 C/ -4 D/ -1

1. **What is the solution set of (2008)**
2. **B. C. D.**
3. **Suppose where Q(x)= is a quadratic function. Which of the following is necessarily true about the graph of f? (2008)**
4. **are the vertical asymptotes of the graph of f**
5. **graph of f does not intersect with its horizontal asymptote.**
6. **The vertical asymptotes of the graph of f is only x=-1 if**
7. **The vertical asymptotes of the graph of f is only x=1**
8. **Which one of the following is true about the horizontal asymptote(s) of the graph (2008)**
9. **Y=2 is the only horizontal asymptote of the graph.**
10. **Y=1 and y=-1 are the horizontal asymptotes of the graph.**
11. **Y=2 and y=-2 are the horizontal asymptotes of the graph.**
12. **Y= 1 is the only horizontal asymptote of the graph.**
13. **The solution set of the equation(2008)**
14. **{0, 1} B. {-1, 1} C. {-1, 0, 1} D. {-1, 0}**
15. What is the simplified form of ?
16. B.
17. Which one of the following is true about the graph of +3?
18. The graph has a hole x = 2.
19. The vertical asymptotes of the graph are
20. A horizontal asymptote of the graph is D.The graph has

**CHAPTER 3**

1. For what value of b does the parabola *p*(*x*) = *a*x2 + *x* + b pass through the points (-1, 5) and (2, -1)?

A. 9 B. 3 C. -3 D. -15

1. A parabola with focus at (3,-1) has directrix y = 3. Which one of the following is the equation of the parabola?

A. = -4 ( *y* + 1) C. = 4 ( *y* + 1)

= -8 ( *y* - 1) D. = 8 ( *y* - 1)

1. A satellite moves along a hyperbolic curve whose horizontal transverse axis is 24 km and an asymptote*y* = *x* + 2. Then what is the eccentricity of the hyperbola?

A. B. C. D.

1. If a line with angle of inclination of passes through (0,1), which one of the following is the equation of the line?

*A. y* = -*x* + 1 B. *y* = *x* + 1 C. *y* = -*x* – 1 D. *y* = *x* – 1

1. If *x*2 – 6*x* + *y*2 + *k* = 0 is equation of a circle with radius 2, then what is the value of *k* ?

A. 13 B. 5 C. 4 D. -4

1. Let the equation *x*2 + 2*x* + *y*2 = 8 represents a circle. Then which one of the following lines cut the circle at exactly two points?

A. 4*x* + 3*y* + 19 = 0 B. 3*x* + 4*y* + 14 = 0 C. 2*y* = 5*x* + 43 D. 2x = *y* -50

1. If the equation (*x*-2)2 – (*y*-2)2 =1 represent a hyperbola, which one of the following represents equation of an asymptote to the hyperbola? *A. y*= 4 – *x* B. *x* + *y* = 1 C. *x* = 2 – *y* D. *x* + 2*y* = 3
2. If two lines *y* = *x* and y = *x* - 4 are tangent to a circle at (2 , 2) and (4 ,0 ), respectively , then what is the equation of the circle?

A. + = 4 C. + = 2

B. + = 4 D. + = 10

1. What is the equation of the directrix for the parabola whose equation is 8*x* + 6*y* + 25 = O?

*A. y* = 3 B. *x* = 2 C. *x* = 0 D. *x* = 4

1. The equation 3*x*2 - 6*x* = *y*2 represents:

A. an ellipse with center at (1,0) C. an ellipse with center at (-1, 0)

B. a hyperbola with center at (1, 0) D. a hyperbola with one of its foci at (1,0)

1. A mirror has elliptic edge. If the shortest and longest distances between any two points on the edge of the mirror through the geometric center of the mirror are respectively 6cm and 10cm, which of the following is a possible equation of the edge of the mirror?

A. + = 1 C. + = 1

B. + = 1 D. +

1. Consider a circle whose center is on the x-axis, If a line given by is tangent to the circle at point (2,2), what is the equation of the circle?

A. x2 + y2 =8 B. (x-2)2 + y2 =4 C. (x - 4)2+y2 =8 D. (x-1)2 + y2 = 5

1. What is the vertex and the equation of the directrix, respectively of the parabola +

A. (0,-1), B. (-1,0), C. (0,-1), D. (-1,0),

1. The orbit of Mercury around the sun forms an ellipse with eccentricity 0.206, length of the major axis 1.16x108km and the sun at one focus. Which of the following is the best approximation of the maximum distance from Mercury to the sun?

A. 7.596x107Km B. 5.695x107Km C. 8.695x107Km D. 6.995x107Km

1. Two perpendicular lines 1 and 2 are intersecting at (-1, 2). If the angle of inclination of 1 is 450, then what is the equation of 2?

*A. y* = - *x* + 3 B. *y* = *x* + 3 C. *y* = -*x* + 1 D. *y* = *x* +1

1. The equation of an ellipse with center at ( 1, 4), vertices at ( 10, 4), and (1,2) is:

A. 4(*x-1*)2 + 81(*y-4)*2 = 324 C. 9( *x-1*)2 + 4(*y-4*)2 = 1

B. (*x-1*)2 + 9( *y-4*)2 = 4 D. 2( *x-1*)2 + 9( *y-4*)2 = 4

1. The value(s) of *x* where the graph of the function *y* = crosses its horizontal asymptote is (are):

*A. x* = -2 B. *x* = -1 and x = 1 C. *x* = 0 D. *x* = - and *x* = 1 +

1. What is the focus of the parabola *y*2 + 4*y* + 8*x* = 4 ?

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

1. Which one of the following is true about a conic section represented by the equation

+ = 1?

B. It is an ellipse whose major axis is vertical when *k*> 9.

C. It is a hyperbola whose foci are at (-3*k*,0) and (3,0) when 0 <*k* < 9.

D. It is a hyperbola whose foci are at (-3*k*, 0) and (3*k*,0) when 0 <*k*< 9.

1. Which one of the following is the center of an ellipse

A. (2,1) B. (2,-1) C. (4,9) D. (-1,2)

1. What is the distance from the origin to the line that passes through (1,0)and (0,1)?

A. B.1 C. D.

1. Line *l* passes through (0,5) and (-5,0). What is the angle between the y-axis and *l* in radian measure?

A. B. C. D.

1. What is the distance between the two foci of the hyperbola whose equation is given by

A. 3 B. C. .

1. Which of the following is the equation of the line through (a, b) and perpendicular to the line passing through (a,2b) and (b, 2a) for a

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

1. Let L1: 3y-9 = 4x and L2:2y-3x+2=0 represent two intersecting lines in a plane. If is the angle of intersection between L1 and L2,then what is

A. 3/2 B. 4/3 C. 1/6 D. 1/18

1. The floor of a conference hall is made in a shape of ellipse. If the largest chord has length 20 meters and the smallest is 16 meters, what is the length between the foci?

A. 24m B. 12m C. 9 m D. 6m

1. Which of the following is an asymptote of the hyperbola?

A. y= -2x+1 C.

B. y= 2x-1 D.

1. For what value(s) of k is the equation: represent a circle?

A. For all B. For all C. For all D. for k =16

1. The equation of the circle with end points of a diameter at (-2,0) and (4,2) is:

A. C.

B. D.

1. Let (a,b) and (b, a) be points such that . Which of the following is the equation of the line through (a, b) and perpendicular to the line containing the given points?

A. y= x+b- a B. y= x-a-b C. y = -x+ b + a D. y= -x + b + a

1. The equation of thecircle tangent to the x-axis at (6,0) whose center is on the line y is

A. + = 9 C. + = 36

B. + = 36 D. + = 9

1. A cross-section of a parabolic reflector is shown in the figure below. The opening at the focus AB, is 12cm. what is the diameter of the opening, CD, 8cm from the vertex?

A

BB

C

D

E

A

BB

C

D

E

A. cm C. 9cm

B. 12cm D. cm

1. Given three points A(1,0), B(-3, 0) and C(1,2), the equation of the line through A and perpendicular             to BC is

A. 2x+y = 2 B. y = -2x +1 C. y = -2x D. x - 2y = 1

1. Let *l* be the line containing (1, 5) and its angle of inclination be which of the following is              the distance from *l* to (-1, 1)?

A. B. C. D.

1. Which of the following is the equation of the circle with center at (2,-1) and tangent to the y-axis?

A. + = 1 C. + = 4

B. + = 9 D. + = 4

1. Given the curve y= which of the following is necessarily true?

A/ The curve has no x- intercept if ac<0. C/ The curve is above the x- axis if ac>0.

B/ The curve has two x- intercept if ac>0. D/ The curve has one x-intercept if ac=0.

1. Given the parabola y=x2 and the circle which of the following is true?

A. The two curves meet in exactly one point. C. The two curves do not meet.

B. The two curves meet in exactly two points. D. The two curves meet in exactly three points.

1. The possible value(s) of c for which the line x+2y=c is tangent to the circle

is (are):

A/ -1 and 9 B/ 0 and 10 C/ 1 and 2 D/ -1 and 3

1. Which of the following pairs of lines are perpendicular to each other?

A. L1:3x-4y-8=0 and L2:4x-3y+8=0 C. L1: 2x+5y+10=0 and L2:2x-5y-10=0

B. L1: 6x+8y-16=0 and L2: 8x-6y-18=0 D. L1: y=2x+5 and L2:y-2x-6=0

1. The value of m for which the two lines 3x-my+1=0 and 6x-4y=0 have no common point is

A/ 0 B/ 2 C/ 3 D/-1

1. The shortest and the longest distances from (7,8) to the circle x2+y2-4x-2y=13 are respectively:

A/ B/ C/ D/

1. Which of the following is not true about the parabola

A/ The focus is at (2p, 0) C/ Its axis of symmetry is the y-axis.

B/ The directrix has equation x=-2p. D/ The length of the latus rectum is /8p/

1. **Which one of the following is equation of a circle whose center is on y-axis and radius is 3?(2008)**
2. **C.**
3. **D.**
4. **The planet mercury’s orbit around the sun is an ellipse with eccentricity 0.206, length of the major axis 1.16x108 km and the sun at one focus. What is the maximum distance from mercury to the sun?(2008)**
5. **6.99x108 km B. 6.99x107 km C. 9.66x107 km D. 9.66x108 km**

1. **The graph of a hyperbola and the lines of its asymptotes are as shown in the figure. Which one of the following is an equation of the hyperbola?(2008)**
2. **The equation of the line that passes through (2, -1) and is perpendicular to is (2008)**
3. **C.**
4. **D.**
5. The equation of the conic sectionrepresents:**(2008)**
6. Circle B. hyperbola C. parabola D. ellipse
7. What is the focus of the parabola**(2008)**
8. (4, 3) B. (0, 3) C. (4, -3) D. (0, -3)
9. What is the equation of a line that passes through point(a,a) in the xy-plane if it is parallel to a line that passes through points (a, b) and (b, a) where ? (2009)

A. B. C. D.

1. What are the value for the center(C) and radius( r) of the circle (2009)
2. C.
3. D.
4. What is the radius of the largest possible circle that can be inscribed in the ellipse given by(2009)
5. B. C. 3 D. 5
6. Suppose the eccentricity of the hyperbola is a reciprocal to that of the eccentricity of the ellipse if the hyperbola passes through a focus of the ellipse, then what is the equation of the hyperbola? (2009)
7. C.
8. D.
9. The earth`s orbit has a semi-major axis (gigameters) and an eccentricity of . What is the approximate value of the semi-minor axis?

A. 152.14 Gm B. 145.32 Gm C. 149.06 Gm D. 149.58 Gm

1. If the circle passing through the point (touches the axis at (0,2),then what is the equation of the circle?
2. 2+ y2 + 5x + 4y + 4 = 0 C. 2 + y2 - 5x - 4y + 4 = 0
3. 2+y2 D. 2 + y2 + 5 - 4y + 4 = 0
4. The center of a circle on the line and the line is tangent to the circle at (1,6). How long is the radius of the circle? A.
5. Which one of the following is true about the pair of lines :
6. Perpendicular lines B. Intersecting lines c. parallel and distinct lines D. representing the same lines
7. What is the focus of the parabola whose equation is

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

1. If a line passes through the point (2, 1) and its angle of inclination is 450 , then which one of the following represents the equation of the line?

A. x= y+1 B. C. y =2x +1 D. 2y + x = 2

1. Which of the following is NOT an equation of a hyperbola?

A. C.

B. D.

124. Consider a gate whose shape is a parabolic arch of height 3m and base width 3m as shown in the figure below. If the origin of the coordinate system is at the vertex, the equation that represets the edge of the gate is:

1. 3m

3m

125. What is the length of the minor axis of

A. B. C. 2 D. 6

126. The equation represents

A. A hyperbola with one of its foci at the origin B. A hyperbola with vertex at the origin

C. A hyperbola with vertices at () and ()

D. A hyperbola with foci at (0, ) and (0, )

**CHAPTER 4**

1. Let *p*,*q* and *r* be propositions such that *p* (*rq*) is false. Then, which one of the following proposition is true?

*A. p* B. *rq* C. *pq* D. *q*

1. Which one of the following is equivalent to ?

C.

*B.*  D.

1. If is true, then which one of the following is necessarily true?

A.q B. C. D.

1. Let and be propositions such that ( is false. Then, which one of the following proposition is true?

B. C. D.

1. Suppose proposition is false (F), which of the following is true?

A. B. C. D.

1. Suppose is even; x is prime; is divisible by 2 which one of the following has the truth value F one the set of natural numbers?

A. C.

D.

1. Consider the following argument form. Production is high if rain continues. Rain does not continue. Therefore, either production is low or rain continues.

Let p: production is low

Q: rain continues

The following table is also given about p and q

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Rows | P | q |  |  |  | q | p |
| 1  2  3  4 | T  T  F  F | T  F  T  F | F  F  T  T | F  T  F  T | T  T  T  F | F  T  T  T | T  T  T  F |

Which of the following is necessarily true?

A. The argument form is valid due to row 2 B. The argument form is valid due to rows 2 and 3

C. The argument form is invalid due to row 4 D. The argument form is invalid due to rows 1 and 3

1. For arbitrary propositions *p* and *q*, which one of the following is a valid equivalence?

A. (*pq*) (*qP*) C. [*pv* ¬*q*] [*pq*]

B. (*pq*) *p*] (*p* ¬*q*) D. [(*p* v *q*) *q*] [ *p*  ¬*q*]

1. Suppose that *p* represents the statement “ *He missed the tournament*”, *q* represents the statement “ *He got the gold medal* ”, And *r* represents the statement “ *He look a trip abroad. ”*  Then which of the following symbolic expression represents the statement: “ If he takes a triple aboard and he does not miss the tournament, then he will get the gold medal.”?

A. ( *rq* ) ¬*p* *B. r*( *pq* ) C. ( *r*¬*p* )*q*  D. ¬ ( *rp* )

1. Which one of the following is NOT a tautology?

A. [*p*  (*qr*)] [ ¬*p*(*qr*)]  *B. p* (*q*  ¬*p*)

*C. p* (*pq*)*q* D. [*p*(*q* ¬*r*)] [¬*p*( ¬*qr*)]

1. If each of the compound propositions P Q, P R and ¬R is True, then which one of the following is True?

A. P B. Q C. Q P D. P ¬R

1. Which one of the following arguments is valid?

A/ C/

B/ D/

1. *Which* one of the following is valid logical arguments?

A.  *C.*

*D.*

1. If x and y are non negative integers, which of the following is NOT true?

A. C.

B. D.

1. For real numbers x and y, which one of the following statements is true?

A. C.

B. D.

1. Consider the following argument: “If he does not love her, she will not marry him.He love her .therefore, she will marry him”. If ‘pand ‘q which one of the following is the correct representation of the argument and its validity?

A. C.

1. Suppose that *l* represents*”I eat lemons”* and *h* represents *“ The lemons are dipped in honey”.* Then which of the following symbols represent the statement *“I eat lemons if they are dipped in honey”?*

*A. B. C. D.*

1. Let P(x): x is positive and Q(x): x>5 Which of the following is the negation of

A. There is x such that

B. There is x such that

C. There is x such that

D. There is x such that

1. Let P(x): is positive. *Which* one of the following is equivalent to

A. C.

D.

1. If (P is FALSE, *Which* one of the following is true?

A. B. C. D.(

1. **If the truth value of a proposition p is False, then which one of the following compound propostion has a truth value True?(2008E.C)**
2. **B. C. D.**
3. **What is the contra positive of “ f then x is integer and x>0.”?(2008E.C)**
4. **if x is not integer or x<0, then x C. if x is an integer and x>0, then**
5. **if x is not integer or x0, then x D. if xx is not integer and x0.**
6. **Which one of the following compound propositions is a tautology?(2008E.C)**

**B. C. D.**

1. Consider the following argument: “ If there is no rain, then there is starvation. There is rain.Therefore, there is no starvation.”

Letting . Which one of the following is the correct symbolic form of the argument and its validity?

1. ?
2. C.
3. D.
4. For real number x and y, which one of the following is **NOT** true?
5. (2+x2 C. (x)(y)(yx2+1)
6. **( 2+1) D.** (x)(y)(yx2+1)
7. Which one of the following is a valid argument?
8. If I don`t change my oil regularly, my engine will die. My engine died, Thus, didn’t change my oil regularly.
9. If I am literate, then I can read and write. I can read but I can`t write. Thus I am not literate.
10. If you do every problem in the book, then you will learn the subject. You learned the subject. Thus, you did every problem in the book.
11. If it rains or snows, then my roof leaks. My roof is leaking. Thus, it is raining and snowing.

**CHAPTER 5**

1. A box contains 5 white, 6 red and 4 black balls of identical size. If 3 balls are randomly taken out of the box one after the other, what is the probability that the first ball is white and both the second and third balls are red?

B. C. D.

1. A committee consisting of 3 students is to be selected from 10 candidates among which 4 are girls. What is the probability that at least one girl is selected?
2. B. C. D.
3. A group of six students take their seats at random in a round table for a discussion. What is the probability that two specific students do NOT sit together?

B. C. D.

1. The mark that students scored in an examination is grouped in class intervals as shown in the following table.

|  |  |
| --- | --- |
| Class interval (Mark) | Number of students |
| 55-64 | 8 |
| 65-74 | 12 |
| 75-84 | 20 |
| 85-94 | 6 |
| 95-100 | 4 |

What is the median of the mark?

1. 25.0 B. 75.5 C. 77.0 D. 79.5
2. How many four digit even numbers can be formed from 1, 2, 3,4 and 5 if the numbers star with3?
3. 40 B. 50 C. 100 D. 120
4. Among students who took a quiz, 15 students scored 6, 20 students scored 7, 10 students scored 8 and 5 students scored 10, what is the average scored of the student?
5. 7.8 B. 7.5 C. 7.2 D. 7.0
6. If *S* is a set with 10 elements and *AS*, what is the probability that*A* has 3 or more elements?
7. B. C. D.
8. A company produced 25,000 bulbs and randomly tested 2% of the product. Among the tested bulbs, if 40 have defect of type *D1*, 60 have defect of type *D2* and 25 have both types of defects, what is the probability that a bulb produced by the company has none of the defect?
9. 0.95 B. 0.80 C. 0.85 C. 0.20
10. If *i* , *Di* and *Pi* are respectively the ith – quartile, ithdecile and ith percentile one of the following is necessarily true?
11. B. *D*3>*P*25 C. *P*25>*Q*1 D. *Q*2 = mean the following
12. If distinct codes (words) of eight letters are formed by rearranging the letters in the word

‘ABBEBAYE’, how many of the codes being B or Y?

1. 840 B. 630 C. 1680 D. 420
2. If the list of a measurement is 10, , 5, , 5, 10, 20, 15, 20, 5 with mean , then what is the value of in terms of ?

A.10 - 90 B. 9 - 90 C. 5 - 90 D. 5 – 45

1. The following is the frequency distribution of a grouped data.

|  |  |
| --- | --- |
| Class Interval | Frequency (*f*) |
| 3-7 | 2 |
| 8-12 | 2 |
| 13-17 | 10 |
| 18-22 | 6 |

What is the mean and standard deviation of the distribution, respectively?

1. 15, B. 15, C. 12.5, D. 12.5,
2. You are given a data on the age of students, in a primary school

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Age | 8 | 10 | 11 | 12 | 13 |
| Number of students | 5 | 15 | 8 | 10 | 2 |

Which of the following is NOT true about the data?

1. The median is 10.5 C. The mean is 10.5
2. The mode is 10 D. The range is 5
3. The following is a table of simple frequency distribution of a data with variable.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x | 1 | 3 | 4 | 5 | 7 |
| Frequency | 2 | 5 | 6 | 5 | 2 |

The standard deviation of the data is equal to:

1. B. 3 C. D.
2. A school has three classrooms for grade 11 namely, 11A, 11B, and 11C, The number of students in these classrooms is 28, 20 and 22, respectively. All the students took an examination and the average score of the students of 11A, 11B, and 11C is 60, 70 and 70, respectively. What is the average score in this examination for all grade 11 students?
3. 66 B. 66.67 C. 65 D. 65.67
4. The following is set of data representing the average mark of 13 students: 91, 89, 93, 91, 87, 94, 92, 85, 91, 90, 96, 93, 89. Then which one of the following statements is true about the data?
5. The median is 90.5 C. The range of the marks is 11
6. The upper quartile is 92 D. The mean is 91.5
7. Different codes, each of which consisting of five characters, are to be generated in such a way that the first two characters are any of the English capital letters (A to Z) and the remaining three are any of the digits ( 0,1,...,9). How many distinct codes can be generates so?
8. 468,000 B. 260 C. 676,000 D. 26! x 10!
9. Three persons p1, p2 and p3 are firing at a target independently and have a probability 0.7, 0.5 and 0.4, respectively, of hitting the target. What is the probability that at least one of them hits the target?
10. 0.95 B. 0.85 C. 0.91 D. 0.99
11. Suppose that the first 3 letters(A, B, and C) and number digits are to be used to form car plates in a small town. How many different plates can be formed in total that contain 1,2 or 3 letters and then followed 3 digits?
12. 3,000 B. 27, 000 C. 39, 000 D. 100,000
13. A city has two daily newspapers, X and Y. The following information was obtained from a survey of 100 residents of the city: 35 people subscribe to X, 60 people subscribe to Y and 20 subscribe to both newspapers. Then how many of the people in the survey do not subscribe to either of the newspapers?
14. 5 B. 25 C. 40 D. 55
15. A measurement is grouped into five class intervals with the following frequency distribution.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Class interval | 5-15 | 15-25 | 25-35 | 35-45 | 45-55 |
| Frequency | 22 | 40 | 68 | 50 | 20 |

What are the first quartile *Q*1 and the 75th percentile *P*75 of the measurement?

1. *Q*1 = 20, *P*75 = 40, C.*Q*1 = 20, *P*75 = 39
2. *Q*1 = 22, *P*75 = 40, D. *Q*1 = 22*, P*75 = 39
3. **The following is a simple frequence distribution of a data with variable X.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **X** | **3** | **5** | **6** | **7** |
| **Frequency** | **2** | **5** | **5** | **1** |

**What are the mean () and variance of the data?(2008E.C)**

1. **= 0.7 C. = 0.7**
2. **= 1.4 D. = 1.4**
3. **A box contains 10 items of which 3 are defective. If 2 items are randomly taken out of the box, what is the probability that both items are not defective? (2008E.C)**
4. **7/10 B. 4/7 C. 7/15 D. 49/100**
5. **Items produced by a certain company are subjected to two kinds of defects D1 and D2. Out of a total product, 5% have defect D1, 10% have the defect D2, and 2% have both defects. What is the probability that a randomly selected item has neither defect D1 nor defect D2?(2008E.C)**
6. **0.13 B. 0.5 C. 0.98 D. 0.87**
7. **There are three children in a room, ages three, four, and five. If a four -year old child enters a room then which one of the following is true? (2008E.C)**
8. **Mean age will stay the same but the standard deviation will increase.**
9. **Mean age will stay the same but the standard deviation will decrease.**
10. **Mean age and standard deviation will increase.**
11. **Mean age and standard deviation will stay the same.**
12. **In how many more ways can 4 people be arranged in a row than if they were arranged in a circle?(2008E.C)**
13. **1 B.6 C. 18 D. 12**
14. **Two machines A and B work independently. The probability that both machines A and B work is 0.4. if the conditional probability that machine B works given that machine A works is 0.5, then the conditional probability that machine A works given that machine B works is\_\_\_\_\_\_\_.(2008E.C)**
15. **0.8 B. 0.3 C. 0.5 D. 0.7**
16. If there are two children in family, what is the probability that there is at one girl in family?
17. Among 2000 student who took a regional exam, the percentile of certain student`s score is 90. Which of the following is correct about the student`s score?
18. The student has answered 90% of the questions correctly.
19. The student`s score is greater than or equal to that of 1800 student.
20. The student`s score is the same as the top 10% of the scores.
21. The score of the student is as good as that of 90% of the student
22. Suppose 2,500 items are produced by a machine and 2% of the product are randomly selected and tested. If 5 of the tested items have a defect, then what is the probability that produced by the machine has No defect?

A. 0.80 B. 0.85 C. 0.90 D. 0.95

1. Fatuma can solve 90% of the problem given in a book and Mesfin can solve 70%. What is the probability that at least one of them will solve the problem, selected at random from the book?

A. 0.77 B. 0.87 C. 0.97 D. 0.67

1. There are three children in a room with ages four, five and six. If a five-year-old child enters the room, then which of the following statement is correct?
2. Mean age will stay the same but the standard deviation will decrease.
3. Mean age will stay the same but the standard deviation will increase.
4. Mean age and standard deviation will increase.
5. Mean age and standard deviation will stay the same.
6. The marks of 50 student is given below

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Marks | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 |
| No. of students | 5 | 8 |  | 10 |  |

If the median of the data is 26, what is the value of and

1. 1 2
2. 1 2
3. 1 2
4. 1 2

**CHAPTER 6**

1. Consider the system

If the determinant of the coefficient matrix is 2, then what is the solution of the system of equations?

1. C.
2. D.
3. Suppose that A and B are 3x3 matrices, I is the identity matrix of order 3 such that AB = 2I. If det B = |B| = 6. What is det (AT )?
4. B. C. 12 D. 48
5. Suppose A = . If X is a 2x2 matrix such that AX – AT= 2A, then what is the value of X?
6. B.. C. D.
7. Suppose *AX* = *b*, where A is a 3x3 matrix, *b* = (b1, b2, b3 )T and

*X* = (*x*, *y*, *z* )T. which one of the following is necessarily true about this system of linear equations?

1. The system has a solution only when det(*A*) 0
2. The cramer’s rule is suitable to solve the system if two roes of *A* are identical
3. If det(*A*) 0 and the second column of *A* is a multiple of *b* then *x* = 0
4. If *b* = 0, then *X*= (0,0,0)T is the only solution of the system
5. If A= and (2A + B)T = AT A, then which one of the following is equal to B?
6. C.
7. D.
8. What should be the value of *k* so that the system of equation

has a solution?

A.0 B. 1 C.- 4 D. 4

1. If M = and ATM = 2I, where A is a 3x3 matrix and I is the indentity                  matrix of the order 3, then what is det(A)?

A. 0.2 B. C. 0.8 D.

1. Suppose *A* = and *B*= . If X is a 2x2 matrix such that

*X* + *BT* = *AB*, then *X* is equal to

1. B. C. D.
2. Which of the following is equal to

?

A.0 B. -2*ac* C. 2*bc* D. 2*c*(*b- a*)

1. If *A* = and = , then is equal to

A. B C. D.

1. Which of the following is the solution set of

?

A. {( 1,0,0,5)} C. 3

B. {(3*t* + 1, 0,*t* ): *t*} D. { }

1. Let A and B be 3x3 matrices such thatand

Which one of the following is equal to ?

1. 1 B. 4 C. 100 D. 400
2. What is the solution set of the following system of equations
3. C.
4. ) D.
5. If= and the determinant of the coefficient Matrix is -5, then the value of x is equal to
6. 3 B. C. D. 5
7. Let A= be 2x2 matrix. Then the value of A2k+1 for k is equal to?

A. B. C. D.

1. Let A= if the minor of an element 0 is -16, then the possible value of x is

A.7,-3 B. 1,3 C. 3,-5 D. -3,5

1. Let A and B be 2x2 matrices, which of the following is always true about A and B?

A. (AB)T = ATBT C. AB = BA

B. (A + B)T = AT + BT D. If AB = ,and |A|, then B is non singular

1. Let B= and A = such that + A = 0. Then                     which of the following is the value of x?

A. 2 B. 0 C. -8 D.

1. Let A and B be 3x3 matrices such that |A| = 1/5 and B=

Which one of the the following is equal to |2AtB|

1. 1 B. 2 C. 4 D. 100
2. If is the inverse of then the value of y is

A. B. 1 C. 2 D. 3

1. If A = then for what values of y is Det(2A) = y2

A. -8 B. 4 C. 8 D. 16

1. If is an invertible matrix and then what is the

value of x?

A/ -1 B/ 2 C/ D/

1. If A = and A-1 = , then what are the values of *x* and *y* ?
2. *x* = 3, *y* = -2 C. *x* = -3, *y* = 2
3. *x* = , *y* = D. *x* = , *y* =
4. If A= , then det( AT A) is equal to\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
5. 12 B. 36 C. 30 D. 15
6. Consider the following system of equations:

If the determinant of the coefficient matrix is 2, then what is the solution set of the system?

1. B. C. D.
2. What is the solution set of the system
3. C.
4. D.
5. Suppose that and are given if the (1,2) entry of the product AB is 11, what is the value of x?

A/ B/ 11 C/ -2 D/ -8

1. What is inverse of

A/ B/ C/ D/

1. Given that , what is the value of ?

A/ 22 B/ 30 C/ 58 D/ 0

1. What is the solution set of the system

A/ B/

C/ D/

1. **If :(2008E.C)**
2. **B. C. D.**
3. **Let . if det(A) = 3, then what is the solution set of the system (2008E.C)**
4. **{} C. {}**
5. **{} D.**
6. **For any Which one of the following is true? (2008E.C)**
7. **The solution of the system of linear equation of (2008E.C)**
8. **C.**
9. **D.**
10. If = then what is the value of?
11. Consider the following system of equation:

How much must be the value of so that the system has a solution?

A. 7 B. 1 C. 0 D.

1. If A is a 33 matrix and det (A) =5, then how much is det (2ATA)?

A. 200 B. 100 C. 50 D. 20

1. If 2= , then what is the value of

**CHAPTER 7**

1. In the set of complex numbers, which one of the following is the solution set of                   *z*3 – *iz*2 + 2*z* = 0?
2. {0} B. {0,-*i*} C. {0, -*i*. 2*i*} D. {0, *i*, -2*i*}
3. Which one of the following is the simplest form of |3+4*i*| - ?
4. 5-5*i* B. 5+5*i* C. 1+3*i* D. 1-3*i*
5. If *z* = cos () +i sin (), then what is the value of z5?

*A.* + B. + C. *i* D. 1+*i*

1. If is a complex number, then + = 1 is equivalent to which one of the following equations?
2. - = 1 B. - = 1 C. - = 2 D. - = 2
3. If and +, which one of the following is the simplest form of z?
4. +2i B. 2 + 2i C. 4-2i D. 2 - 2i
5. Let be a complex number. Which of the following is the solution set of -iz = 0?
6. C.
7. D.
8. In the set of complex numbers, the solution set of x2 – 2x +5 = is
9. C.
10. D.
11. If *z* = is a give complex number, then what is the conjugate, , of *z*?
12. = C. , = -6 – *2i*
13. = D. = -1 – *i*
14. What is the principal argument of ( 5+5i)11?
15. B. C. D.
16. What are the values of *u* and *v* that satisfy the equation: = ?
17. *u = 2, v = 3* C. *u = 2, v = 16*
18. *u = -6, v = 10* D. *u = -4, v = 6*
19. Which of the following are the values of y and z respectively if

?

1. , -5 B. C. D.
2. Which one of the following is the simplest form of ?

A.1+I B.1+3i C.2-I D.1-3i

1. In the set of complex numbers, the solution set of

C.

D.

1. Let z be a complex number such that then , the modulus of z is equal to:

A. B. C. D.

1. In the set of complex numbers, the solution set of
2. {2} C.
3. D.{2, 2+8i, 2-8i}
4. If the complex number a+bi corresponds to the point(a,b), to what point does correspond?
5. B. C. D.
6. Which of the following is a polar form of ?
7. Cos1200 +isin1200 C. cos600 + i sin600
8. Cos2400 + i sin2400 D. –cos1200 + isin1200
9. Which one of the following statement is true about a complex number z ?
10. Multiplying z by i translate z by 1 unit.
11. Dividing z by i rotates z clock wise by 1800.
12. Multiplying z by –i rotates z counterclockwise by 1800.
13. Multiplying z by –i rotates z counterclockwise by 900.
14. **In the set of complex numbers, what is the solution set of (2008E.C)**
15. **B. C. D.**
16. **If then which of the following is equal to z ?(2008E.C)**
17. **B. C. D.**
18. **(2008E.C)**
19. **B. C. D.**
20. Which one of the following is the multiplicative inverse of ?
21. C.
22. D.
23. Let be a complex number and = , then what is the value of?
24. What is the polar form of ?
25. (cos) C. 2 (cos sin )
26. (cos) D. 2 (cos sin )

**CHAPTER 8**

1. If A =( -2,3), B =(3,1) and C is any other point on the plane, then which one of the following is the coordinate form of - ?
2. ( -5,2) B. ( 5, -2 ) C. ( 1, 4 ) D. ( -1, -4)
3. What is the equation of a line that passes through the point ( -1,2) and parallel to the vector(1,1)?
4. 2*x*-*y* = 1 B. *x* + *y* – 1= 0 C. *x* – 2*y* = 3 D. *y* – 2*x* + 1 = 0
5. What is the image of the line given by (*x,y*) = (-1,0) + *t(*3,6), *t* , under the translation that takes (1,0) to (0,1) followed by the reflection about the line *y* = 2*x*?
6. *y* = 2*x* +3 B. *y* = 2*x* -3 C. *y* = 2*x* + 6 D. *y* = 2*x* – 5
7. If a point ( 2,5) is reflected under a line to the point ( -3,1), what is the line of reflection?
8. 2*x* + 3*y* = 7 B. *x* + 3*y* = 7 C. 8*y* + 10*x* = 19 D. 2*x* + 3*y* + 5 = 0
9. Suppose - and is a vector in the *xy* – plane such that the angle between and is . If is the unit vector in the direction of , then . ( - )is equal to:
10. 20 B. 5 C. 15 D. 30
11. If is the line passing through ( 0, 2) and parallel to V= + 3 , which one of the following is true about and the circle ( *x* – 2)2 + (y – 1)2= 5?
12. is tangent to the circle at ( 0, 2)
13. is tangent to the circle at some point *P*
14. is tangent to the circle at two distinct points
15. he distance between and the center of the circle is greater than
16. If a translation T takes the circle *x*2 + *y*2 - 2*x* + 6y+3 = 0 into the circle whose equation is

(*x* + 2)2 + ( *y* – 4 )2 = 7, then what is the image of the origin under *T* ?

1. ( -3, 7) B. ( 1, 2) C. ( 1, -3) D. ( -2, 4 )
2. If is perpendicular to , what is the cosine of the angle between and ?
3. B. C. D.
4. Which one of the following is necessarily true?

A. If = , then

B. = , for any teal number k

C. If is parallel to , then = 0

D. If a unit vector in the direction of, then =

1. A line given by a vector equationr*(t*) = (0,3) + *t*(1,1) is tangent to a circle at point(0,3). If the radius of the circle is , which one of the following is the center of the circle?
2. ( 1, 4) B. ( 1, -1 ) C. ( -1, 2 ) D. ( 1, 2 )
3. What is the image of the ellipse whose equation is - = 2 under a translation that takes ( 2, 1 ) to ( 4, 0 ) followed by a rotation of 900?
4. + = 2 C. - = 2
5. + = 2 D. + = 2
6. If = ( -3, x) and = ( x, y -2 ) are vectors, what is the value of y so that

+ = 3 - ?

1. B. C. -4 D. -
2. Suppose *p*(1,2,1) and *Q*(1,0,2) are points in space and . If is parallel to and is parallel to and . = -10, then which one of the following is true?
3. and has the same direction C. =
4. =10 D. =2
5. Let i and j be the standard unit vectors in the directions of positive x-axis and positive y-axis, respectively, and be a vector from the point If = 3 - , then the unit vector in the direction of is equal to
6. B. C. D.
7. Let be the line whose equation is 2x –y = 10. Which one of the following is the equation of the image of after a reflection in the line = 2x-5 followed by a rotation through the angle of 900 about the origin?
8. B. C. D.
9. A patrol boat on a sea sailed from its station 10km to the south and then changed its course and sailed km in the direction N 600E, Then what is the distance the bat should travel in order to return to its station by the shortest route?
10. 4km B. 3km C. 9km D. 7km
11. Which of the following is a vector that lies on the line through (0,0) and (2,4)?
12. B. C. D.
13. If the translation T takes the point (1 ,2) to the point (3,4), then which of the *following* is the image of the line 2x + 3*y* + 6 = 0 under T ?
14. 2*x* + 3*y* -16 = 0 C. 2*x* + 3*y* – 4 = 0
15. 2*x* + 3*y* + 16 = 0 D. 3*x* + 2*y* -4 = 0
16. The equation of the image of the line y = x+1 after a rotation about the origin through 900 in a counterclockwise direction is
17. *y* = -*x* B. *y* = *x*-1 C. *y* = *x*+1 D. *y* = *x*-1
18. If the line 3*x* - 4*y* + 10 = 0 is translated by T to 3*x* – 4*y* + 27 = 0 and the image of point (0, 1) by T is (3,*t*), then which of the following is the value of *t* ?
19. -3 B. -2 C. -1 D. 0
20. If and are vectors such that = 4, = and . = -3, then what is the magnitude of - ?
21. 5 B. 7 C. D.
22. The angle between the vectors = - and = 2 is
23. B. C. D.
24. Let = (-1, 10) and = (1,3). A unit vector in the direction of - is
25. ( -3/5 , 4/5 ) B. (-3/5, 3/5) C. (3/5, -4/5) D. (3/5, 4/5)
26. Which one of the following pairs of vectors are NOT parallel?

A. (2, 1) & (4, 2) B. (6, 4) & (3, 2) C. (-1, 1) & (1, -1) D. (1, 2) & (3, 4)

1. Which one of the following is the image of the point p = (4, 1) after a reflection by the line              x – y + 1 = 0?

A. (-4, 3) B. (0, 5) C. (-1, 8) D. (-3, 4)

1. If are vectors, then which of the following isTRUE?

A. C.

B. D. the length of

1. If a straight line passes through the point (1, 0) and the center of the circle whose equation          is x2 + y2 – 4x + 2y +1 = 0, then which one of the following is the parametric vector                         equation of the line?

A. C.

B. D.

1. If and are vectors such that and and then

what is  the magnitude of

A. B. 7 C. D. 5

1. The angle between and is:

A. B. C. D.

1. Let and . A unit vector in the direction of is:

A. B. C. D.

1. If and is a unit vector that makes an angle of with vector , then                            is equal to:

A. B. C. D.

1. What translation vector takes the parabola x – y2 – 2y = 0 to x – y2 = 0?

A. B. C. D.

1. Suppose that the equation of a line is given by What is a            parametric form of the equation of line

A. C.

B. D.

1. What is the image of the circle after it is reflected in the line y-x=0?

A.=4 B.

C. D.

1. If = 4 - 3 and is a unit vector such that 2 = 27,then the cosine of the angle between and is equal to \_\_\_\_\_\_\_\_\_.
2. 0.1 B. 0.3 C. 0.3 D. 0.4
3. If A = (1, -2), B = (-3, 2) and is a position vector such 2 + = , then is

equal to \_\_\_\_\_\_\_\_\_\_\_.

1. ( 2, 0 ) B. ( -1, 0 ) C. ( -2, 2 ) D. ( 2, -2 )
2. If the tail of a vector is the origin and its head is at the point , then what are the magnitude and direction angle, respectively, of ?

A/ -6; 300 B/ 12;600 C/ -4; 600 D/ 4;3000

1. What is the image of the circle after it is reflected in the line y= -x?
2. C.
3. D.
4. Let which one of the following is equal to
5. (-5,5) B.(-5,9) C. (-8, 9) D. (-8, 12)
6. If the standard form of the equation of the line is: then what is the vector form of ?
7. r = (2,-3)+ t(-2, 1) C. r = (0,1)+ t(2, -3)
8. r = (1,-2)+ t(0, 3) D. r = (0,-1)+ t(3, 2)
9. Which of the following is a vector parallel and opposite direction to
10. B. C. D.
11. What is the image of point(-2, 3) in reflection about the line x= -1 ?
12. (0, 3) B. (-1, 2) C. (1, 0) D. (1, 3)
13. A translation T(x, y)= (x-h, y-k) takes the line –x+5y = 2 to the line –x +5y = 10, which of the following relationship is true?
14. h-5k = 8 B. h- 5k = -8 C. –h +5= 10 D. –h +5k = -10
15. Suppose + and is a vector in space such that ||= . if is the unit vector in the direction of then is equal to:

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

1. **What is the value k, for which the two vectors are perpendicular?(2008)**
2. **4 B. -4 C. 3 D. -3**
3. **If are parallel vectors with opposite directions and is equal to:(2008)**
4. **B. C. D.**
5. **If then (2008)**
6. **¼ B. 4 C. ½ D. 2**
7. **If where A and B are distinct points in the coordinate plane, then which one of the following is equal to 3(2008)**
8. **6 B. -6 C. 12 D. -12**
9. **The image of a figure with vertices A(1, 2), B(3, 6), C(-1, 2), and D(-2, -2) after reflection across the**

**x-axis is:(2008)**

1. **A’(1, -2), B’(-3, -6), C’(1, -2), and D’(2, 2) C. A’(1, -2), B’(3, -6), C’(-1, -2), and D’(-2, 2)**
2. **A’(1, -2), B’(-3, 6), C’(1, -2), and D’(2, -2) D.A’(1, -2), B’(3, 6), C’(-1, 2), and D’(-2, -2)**
3. When the plan is rotated 45 about the point (1,-2) then what would be the image of the point (2, 4)?
4. C.
5. D.
6. Let be the line given by the vector equation (x,y)=(1)+ ,1) , what is the equation of the image of after being rotated 150 about (1,1) and then translated by vector U=(-1,1)?
7. C.
8. D.
9. If the angel between the vector = (2,-1, 1) and = (1, 1,) is , then what is the value of ?

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

1. and V= , then what is the unit vector in the direction of 5u+v?
2. **C.**
3. D.

**CHAPTER 9**

1. If *f* (*x*) = 2 - , then which one of the following is the amplitude and period of *f*, respectively?

and 4 B. and 4 C. 2 and D. and

1. Suppose that an airplane is descending at a speed of 50 miles per hour at an angle of 300 below the horizontal line. What is the *x*- and *y*- components, respectively, of the velocity of the plane?
2. 50, 25 B. -25 C. 25-25 D. 25, -25
3. An observer on level ground is at a distance 10 m from a building. The angles of elevation to the bottom of the windows on the second and third floors are 300 and 600, respectively. What is the distance h between the bottoms of the windows?

[ *you may use the values: sin 300 = cos600 = and Sin* 600 = *cos* 300 = ]

1. 15m B. 20m C. 15 m D. 32m
2. If = 2 arctan , then which one of the following is equal to sec
3. B. C. D.
4. What is if 0 < x < 1 ?
5. B. C. D.
6. What is the solution set of cos2*x* +)?
7. C. { 0, }
8. D.
9. Which one of the following is equal to sec sin3x + Cos2x?
10. 2cos *x* B. 2sin*x* C. cos2*x* D. sin2*x*
11. Line passes through (0,5) and (-5,0). What is the angle between the -axis and in radian measure?
12. B. C. D.
13. Which one of the following is a simplified form of csc –x)cos x-x?
14. 2cos x B. cos2x C. 2 sin x D. sin 2x
15. Cos is equal to:
16. B. C. D.
17. The simplest form of the expression
18. B. C. 1 D.
19. What is the value of )
20. B. C. D.
21. Which one of the following identity is incorrect?
22. C.
23. D.
24. The angles of elevation of the top of a tower from the top and bottom of a building 100 meters tall are 300 and 450 respectively. What is the height of the tower (assume that the tower and the building are at the same level)

A. 100√3 m B. C. 100 D. 50

1. If then what is the value of ?

A. B. C. D.

1. Which one of the following is the solution set of the equation

in the interval [0,2]

1. {} B. } C. D.
2. Which one of the following is the solution set of the equation in the

interval [0, 2] ?

A . } B. } C. } D .}

A. B. C. D.

1. Two ships, one with angle of depression 600 due east and the other with 300 due west are observed from a plane 1,000 meters above a sea. If the two ships are on the same line, what is the distance between the two ships?

[*you may use the values: sin 300 = cos 600 =*  and sin 600 = cos 300 = 32.]

1. 4,000m B. 500m C. 2,000m D. 600m
2. What is the amplitude and period, respectively, of the graph of *f*(*x*) = -6 sin *x*Cos *x* ?
3. 3, B. 6, C. 3, D. 6, 2
4. What is the work done ( in Joules ) when a force of 50 Newton is used to pull a crate 20 meters along a level path if the force is at an angle of 600?

[Remember that: Work = ( Force) x (distance travelled).]

1. 360 B. 500 C. 760 D. 1500
2. What is the possible value of x that solves the equation:
3. B. C. D.
4. If angle is an acute angle of a right triangle, what is the length of the side adjacent to , given that the hypotenuse has 6 units length and sec = 10/3?
5. 1.8units B. 2 units C. 18 units D. 20 units
6. is equal to:

A. ½ B. C. 0 D.

A/ C/

B/ D/

1. If , then what are the amplitude and period of the graph of f.

A/ B/ C/ D/ 3,5

1. The simplified form of is:

A/ Cos 2X B/ C/ D/ sec 2x

1. 3 tan 9300 +sin 12000-cos14100 equals:

A/ 0 B/ C/ 2 D/

1. Which of the following is a correct identity?
2. C.
3. D.
4. Which of the following is equal to
5. B. C. D.
6. What is the solution set of the equation in the interval [0, 2]?
7. {} C. {}
8. {} D.
9. If , then what are the amplitude and period of the graph of f?
10. 3, B. ½,3 C. ½ , D. 3,5
11. What is the value of ?
12. B. C. D.
13. Which of the following is true about the function
14. The period of f is. C. f(x)<0 for 0<x<
15. If D. the graph of f is increasing on [0,2]
16. What is the simplified form of
17. –sinx B. –cosx C. sinx D. cosx
18. On the interval [0,], what is the solution set of
19. B.{} C. {} D. {}
20. In the interval [0,], what is the solution set of the equation
21. {0, } B.{} C. D. { }
22. What is the period of the function
23. 2 B. C. D.
24. **What is the value of (2008)**
25. **B. C. D.**
26. **What is the amplitude and period, respectively, of the graph of (2008)**
27. **4, B. 2, C. 2, D. 4,**
28. **A boat on a sea sailed from its station toward north with constant speed of 80 km/h. Another boat from the same station sailed 600NE( north East) with constant speed of 100km/h. If the two boats started sailing at the same time, what is the straight distance between them after they have sailed for just 30 minutes?(2008)**
29. **10km B. 90km C. 10 km D. 10**
30. **If (2008)**
31. **B. C. ½ D.**
32. **If , then which of the following is equal to (2008)**
33. **9/16 B. 9/25 C. 16/25 D. 7/25**
34. **If is a first quadrant angle, then what is the value of 2009**
35. **1/3 B. 3 C. D.**
36. **If 2009**
37. **B. C. D.**
38. **Which one of the following is true? 2009**
39. **The amplitude of .**
40. **The period of**
41. **The period of**
42. **The amplitude of .**
43. **What is the period and range of (2010)**
44. **C.**
45. **D.**
46. **If in what is the length of AC and the cosine of <A, respectively? (2010)**
47. **C.**
48. **D.**
49. **If is a fourth quadrant angle and sec then what is csc equals to?(2010)**
50. **B. C. D.**
51. What is the value of cost 270+ 2 cos 90%+ 4 sec2 180 ?
52. -2 B. 8 C. 4 D. 7
53. What is the value of cost 270+ 2 cos 90%+ 4 sec2 180 ?
54. -2 B. 8 C. 4 D. 7
55. Ship A and B depart from the same point at the same time on the course N60E and N40E, respectively. If the speed of ship A 20 km per hour and speed of ship B is 30km per hour, what is the distance between the two ship just after 30 minutes of their departure?

[

A. Km B. Km C. Km D. Km

1. The diagram below is a representation of a 25 m vertical observation tower TB and two cars K and L on a road. The angel of depression from T to car L is 30. The angle of elevation from car K to the top of the tower is 60. B,K and L lie in a straight line and lie on the same horizontal plane as the base the tower.

**T**

**25m**

300

600

B K L

What is the distance between the two cars?

1. m B.50 m C. m D.50+ m
2. What is the solution set of sin2 xsin x cos x=0 over [0, 2]?
3. C.
4. D.

**ABOKER PREPARATORY SCHOOL, HARAR**

**MATHEMATICS ENTRANCE EXAM (2000 - 2010E.C)**

**COMPILED BYDEPARTMENT OF MATHEMATICS**

**GRADE 12**

**CHAPTER 1**

**Directions:** Solve each of the following questions and choose the best answer to the problem from the given alternatives. Write the letter of your choice in capital letter

* 1. A certain meeting hall has 20 rows of seats. There are 20 seats in the first row, 22 seats in the second row, 24 seats in the third row, and so on. How many seats are there on the last (20th) row of the hall?

A. 46 B. 58 C. 760 D. 5240

* 1. Which one of the following is an arithmetic sequence?

A. 3,5,7,9,11,... C.-3, 6, -9, 12, -15, ...

B. 3, 6, 12, 24, 48, ... D.1, 3, 6, 10, 15, 21, ...

* 1. Which one of the following sequence is a convergent sequence?

A. 1, 1,1,... C.

B. D.

* 1. What is the sum of all multiples of 3 between 20 and 200?

A. 7,227 B. 6,570 C. 6,150 D. 5, 166

* 1. A ball is thrown vertically from ground up to a height of 16m. Each time it drops h meters, it rebounds 0.80h m. noting that the ball travels every height of h twice, what is the total vertical distance travelled by the ball before it comes to rest?

A. 40*m* B. 80*m* C. 160*m* D. 320*m*

* 1. In an arithmetic sequence, the 4th term is 42 and the 10th term is 30. What is the maximum possible partial sum?

A. 1200 B. 900 C. 450 D. 600

* 1. The sum of whole numbers that are less than 100 and leave remainder 2 when divided

by 5 is equal to:

A.990 B. 988 C. 1976 D. 899

* 1. The sum of the infinite series is equal to:

A. B. C. D.

* 1. If the 4th and 7th terms of a geometric sequence are -1/4 and -2 respectively, then which of the         following is not true?

A. The first term is -1/32 C. The 4th term is 4 times the 2nd term.

B. The common ratio is 2 D. The 5th term is -1.

* 1. Let an = n+ cosn, n=1,2,3… be the nth term of a sequence. Then which of the following is true?

1. The fifth term is 6 C. a7 + a8 = 15
2. The 10th term is 9 D. a7 – a6 =1
   1. If {An} is an arithmetic sequence with first term A1= 5 and fifth term A5= 21, then the partial sum is equal to:

A.760 B.780 C.860 D.870

* 1. What is the sum of the series ?

A.6 B.18 C.27 D.

* 1. The sequence converges to:

1. B. -2 C. 0 D. 1
   1. Which one of the following represents is a geometric sequence?
2. 3,1, C.1,3,6,10,15, ...
3. D. -3,6,-9,12,-15, …
   1. What is the actual value of the sum?
4. 0.325 B. 1 C.
   1. What is the sum of the series ?
5. B. -0.13 C. -0.1 D.
   1. A ball is thrown vertically from ground up to a height of 16m. each time it drops h meters, it rebound 0.8h m. noting that the ball travels every height of h twice, what is the total vertical distance traveled by the ball?
6. 40m B.80m C. 160m D. 320m
   1. The sequence converges to:
7. B. -2 C. 0 D. 1
   1. What is the 50th term of the sequence 3,10, 17, 24, 31,…?
8. 310 B. 346 C. 510 D. 531
   1. If {} is a sequence such that +4 for all n is equal to:
9. 2460 B. 2458 C. 2450 D. 2442
   1. What is the sum of the series ?
10. 40 B. 20 C. 10 D. 8
    1. What is the limit of the sequence 1,-
11. -1 or 1 B. 0 C. e D. does not exist
    1. If a geometric progression then which of the following is a general formula for

A. B. C. D.

* 1. What is the sum of the first 20 terms of the sequence 3,7,11,15,…?

A.741 B. 820 C. 899 D.903

* 1. If the kth term of a sequence is what is its next term when k is even?

1. B. C. D.
   1. Suppose a geometric sequence has terms which of the following is equal to

A. B. C. D.

* 1. Consider the sequence {}, where the first term is for all then, the sum is equal to:

1. 2460 B. 2458 C. 2442 D. 2450
   1. The sum of the series is equal to:
2. B. C. D.
   1. Which one of the following sequence is a divergent sequence?
3. C.
4. D.
   1. Which one of the following is true about
5. The least upper bound of the sequence is 7/3 C. 1.6 is its lower bound
6. The sequence is monotonic D. is a term of the sequence
   1. What is the sum of the series?

A. B. C. D.

* 1. Which of the following is a divergent sequence?

1. B. C. D.
   1. Let be a sequence such that which of the following is not true about the sequence?
2. B. C. if n is odd D. if n is even
   1. Let the sum of the first n terms of a sequence which of the following is the third term
3. 8 B. 12 C. 16 D. 20
   1. Consider the sequence where the first term is , and
4. B. C. D.
   1. Which of the following is not true about

A.It converges to 0 C. It is bounded

B.It is decreasing D. It diverges

* 1. Suppose that every year the amount of atoms of certain radioactive substance is half of its previous year. If there were atoms of the substance during the initial observation, how many atoms of the substance are present by the end of 20 years after the initial observation?(2008)

A. B. C. D.

* 1. **If is an arithmetic sequence such that its 1st term and its 5th term , then its 11th term is equal to(2008)**

1. **40 B. 50 C. 45 D. 55**
   1. **What is the sum of all multiples of 4 that are between 30 and 301? (2008)**
2. **12,882 B. 11,288 C. 6,288 D. 6,882**
   1. **The nth term of the sequence: 1, -4, 9, -16, … is : (2008)**
3. **C.**
4. **D.** 
   1. **The sum of is \_\_\_\_\_\_\_(2008)**
5. **0 B. 15 C. 10/3 D. 5**
   1. **In which interval the sequence is bounded?(2008)**
6. **B. C. D.** 
   1. **What is the sum of the infinite series (2008)**
7. **98/101 B. 100/101 C. -98/101 D. -100/101**
   1. **What is the sum of the series ?**
8. **B. 4 C. 6 D.3/2**
   1. **Which of the following relations holds for the sequence: -10, -3, 4, 11, …?(2009)**
9. **C.**
10. **D.** 
    1. **(2009)**
11. B. C. D.
    1. **Which of the following is the sum of the series (2009)**
12. -5 B. -3 C. 3 D. 5
    1. **Suppose a radioactive material loses one-third of its mass per year. If its current mass is 81g, then how much will its mass be just after 7 years? (2009)**
13. 27g B. g C. g D. g
    1. **Which of the following is a convergent sequence?(2009)**
14. B. C. D.
    1. =6, , a4=
15. 20,020 B. 20,200 C. 20,000 D. 22,000
    1. Everyday a person saves 5 cents more than the amount he saved on the previous day. His target is to save the total amount of 3225 cent by the end of 30 days. How much must be the starting saving to meet the target?
16. 35 cent B. 25cent C. 50 cent D. 60 cent
    1. If the second and fifth terms of a geometric progression are respectively, what is the sum of first eight terms of the sequence?
    2. What is the sum of the infinite series ?
17. 15 B.

**CHAPTER 2**

* 1. The least upper bound of the sequence is

A. 0 B. C. D. 1

* 1. To which of the following is equals to ?

1. 4 B. 0 C. -1 D. -4
   1. Which one of the following is equal to ?
2. 6 B. -3 C. -6 D.
   1. The ozone level (in ppb – parts per billion) on a sunny day in a metropolitan area is given by the formula: *p(t)* = 80+12*t* – *t2*, where *t* is time in hours and *t* = 0 corresponds to 9 A.M. What is the rate of increase of the ozone level after 3 hours (i.e. at 12A.M.) ?
3. Ppb B. 12ppb C. 107ppb D. 113ppb
   1. Let *f (x*) =

If *f* is continuous at *x* = 0, then what is he value of *a* ?

1. B. 2 C. D. -2
   1. Which one of the following is equal to ?
2. *e*2 B. *e*-3 C. *e*-2 D. *e*3
   1. is equal to:

A/ e B/ C/ -e D/ 1-e

* 1. equals:

A/ 3/2 B/ 3 C/ D/ 1

* 1. is equal to:

A/ B/ 1 C/ 2 D/

1. B. C. D.
   1. which one of the following is equal to
2. B. C. D.

A. B.0 C. 4 D. 3

* 1. then the limit of the sequenceis equal to:

1. 1 B. e C. e2  D. +
   1. which of the following is equal to
2. B.0 C. D.
   1. If then what is the limit of the sequence
3. 0 B. ½ C. 7/8 D.+
   1. Given that andwhat is the value of

A. B.. C. 0 D. does not exist

* 1. Let *f (x*)= . If f is continuous at x=0, then what is the value of a?

1. 4 B.2 C. D. -4
   1. Let be a continuous function such that f(2)=2/3 and f(0)=3.Then equals:

A/ 3 B/ 2/3 C/ 2 D/ doesn’t exist

* 1. If f (x) =, then what is ?

A.5 B.4 C.2 D.0

* 1. What is the value of?

1. B. C. D.
   1. Which of the following is equal to ?
2. B. C. D.
   1. Let if f is continuous at x= 0, then what is the value of k?
3. 6 B. 5 C. 2 D. 0
   1. Which of the following is equal to ?
4. B. C. 0 D.
   1. Which of the following is equal to ?
5. 1 B. C. 0 D. doesn’t exist
   1. For a real number s, the function f(x) is defined by which value of s make the function f(x) continuous for all x>0?
6. B. C.0 D. 2
   1. Which of the following is equal to
7. -1 B.C. 1 D.
   1. is equal to
8. 2 B. 1/3 C. 2/3 D.
   1. is equal to

A.-2 B. 1 C. 4 D. does not exist

* 1. What is the left hand limit,

A. 0 B.-2 C. -1 D. does not exist

* 1. Let for what value of a is f a continuous function ?

A.1 B. 3/2 C. 2 D.3

* 1. Let then

1. B.-1 C. 0 D.
   1. Which of the following is equal to ?

A. 0 B.1/4 C. 1/8 D.1/16

* 1. What is the value of

1. 0 B. 1 C. e D.
   1. For a non zero real number k, let the function f be defined by

Which one of the following value of k make the function f continuous at x=0?

1. B. C. D. -1
   1. A function f is defined by then the value of k such that f is continuous at x=3 equals:

A. 5 B. C. D. 2.5

* 1. Let . Then,

A. 0 B.1/4 C. 1 D.

* 1. :

A. 0 B.2 C. 1 D.

* 1. Which of the following is equal to ?

A.2 B. C.0 D.1

* 1. The left hand limit,

A. 0 B.-2 C. -3 D. does not exist

* 1. Which of the following is equal to ?

1. -1 B. 0 C.1 D. 3
   1. Let what is the value of b if f is continuous at x = 1?
2. B. C. -1 D. 3
   1. On which of the following intervals is f continuous, where

A. B. [-2 C. [-1, 2] .

* 1. The left hand limit, is equal to\_\_\_\_\_\_\_\_\_\_(2008)

1. 0 B. 2 C. 1 D. does not exist
   1. Which one of the following is equal to (2008)
2. 2 B. 0 C. 1 D. 3
   1. Which one of the following is true about the function f defined by (2008)
3. f is continuous except at x =0. C. f is continuous everywhere
4. f has an infinite discontinuity at x = 0. D. f has x = 0 as a vertical asymptote
   1. (2008)
5. 0 B. 1 C. D. -1
   1. Which one of the following is equal to ? (2008)
6. B. 4 C. 1/8 D. ¼
   1. What is the value of (2008)
7. 0 B. C. -1 D. does not exist
   1. Which one of the following is equal to (2008)
8. B. C. D.
   1. is equal to\_\_\_\_\_\_\_\_\_\_\_\_(2008)
9. 4 B. 2 C. 1 D. -2
   1. ?
10. -1 B. 0 C.
    1. What is the limit of the sequence 1, , ,, . . . ?

A. 0 B. 1 C.

* 1. What is the value of left-hand side limit, **?**
  2. What is the value of ?

1. 2 B. 3 C. D. The limit dose not exit

A. 1

**CHAPTER 3**

* 1. If *f (x)* = , g(2) = 1 and g'(2) = 10, then which one of the following is equal to *f* '(2) ?

1. -8 B. C. D.
   1. A business association gets a net profit of Birr 3,000 at the end of each month. Just after the fifth year, its amount was Birr 230.000. What was the starting amount of the business?
2. Birr 47,000 B. Birr 50,000 C. Birr 53,000 D. Birr 56,000
   1. If and then is equal to:

A. C.

   B. D.

* 1. If g(x) =

A/ B/ C/ D/

* 1. If *f* (2) = -3, *f* ʹ(2) = 4, *g*(1) = -5, *gʹ*(1) = 1 and *F*(*x*) = *f* (2*x* + 2 ) . *g* (1-*x*2), then what is the value of *F*ʹ(0)?

1. 19 B. 0 C. -20 D. -40
   1. Suppose that a function f has the property that *f* (*x+y*) = *f (x*) . *f* (*y*) for all values of *x* and *y* and that *f* (0) = 2, *f ʹ* (0) = 1. Then which one of the following represents the formula for the derivative f ʹ(*x*)?
2. *f ʹ*(*x*) = 2*f ʹ*(*x*) + 1 C. *f ʹ*(*x*) = *f* (*x*) + 2
3. *f ʹ*(*x*) = *f* (*x*) + 2*f ʹ*(*x*) D. *f ʹ*(*x*) = 2*f* (*x*) -1
   1. If f(x) = n , which of the following is equal to *f*(x)?
4. B. C. D.
   1. For what values of *a* and *b* is the function

*f* (*x)* = differentiable at *x* = 1 ?

1. *a* = 6, *b* = 0 C*. a* = 0, *b* = -2
2. *a* = -3, *b* = 1 D*. a* = -6, *b* = 4
   1. Let \_\_\_\_\_\_\_\_\_

A. C. 2

B. D.

* 1. If is:

A/ 1 B/ 0 C/ -16 D/ -1/4

* 1. If h(x)=, then what is the value of

A/ 0 B/ 1 C/ 2 D/ 3

* 1. If f(2)= -3, , then the

value of

A/ 20 B/ 14 C/ -22 D/ 26

* 1. Let G(x)=f(x3+1). If , then \_\_\_\_\_\_\_\_\_\_

A/ 3 B/ 9 C/ 6 D/ 15

* 1. If \_\_\_\_\_\_\_\_\_

A. cos(x-cos (2x)) + 2 sin (2x)cos(x-cos(2x)) C. - sin (x- sin (2x))

B. 2cos (2x) sin(x- sin (2x))-sin (x-sin(2x)) D. -sin (1-2cos(2x))

* 1. Let and f(0)= 1, then f(x) is equal to:

A/ B/ C/ D/

* 1. At what point does the equation of the line tangent to the graph of

A/ (-1,1) B/ (0,0) C/ (-1/2,0) D/ (2,2)

* 1. Which of the following statement is true?

A/ If a function is continuous at a, then it differentiable at a.

B/ If a function is not differentiable at some point in its domain then it is not continuous.

C/ If a function is differentiable in its domain, then it is continuous at every point of its domain.

D/ If the derivative of a function at some point is zero, then the function is a constant function.

* 1. Let f(x)= 𝓁n (x2+2x), then =\_\_\_\_\_\_\_\_\_

A/ B/ C/ D/

* 1. If f(x)= x2g(3-x2), g(2)=3,(2)= -4, then (-1) is equal to

A/ 20 B/ -14 C/ -7 D/ -4

* 1. The weight w of a person in kilograms and the person’s height h in meters are related by the equation if ln2=0.6, ln3= 1.1 and ln5 = 1.6, then what is the height of a person whose weight is 60kg?

A. 1m B. C. D.2m

* 1. For what is the equation of the tangent line to the graph of f at x =2 ?

1. Y- 4 = 16(x-2) C. y =
2. Y= 17(x-2)+16 D. y= 8(x-2) +32
   1. If F(x)=f(2x+2).g(), with f(2)=-3, f ’(2)=4, g(1)= -5, and g’(1)= 1, then what is the actual value of F’(0)?

A. -40 B. -20 C. 0 D.19

* 1. If then is equal to:

1. C.
2. D.
   1. If then the simplified form of

A. C.

B. D.

* 1. If then f ‘(1) is equal to:

1. 2 B. C. 1 D.0
   1. Let for what value of a is f ’(a)=1?

A. B. C. D.3

* 1. If f(x),then what is f’’(x)?

1. C.
2. D.
   1. If then which of the following is equal to
3. 11 B.8 C. 2 D.0
   1. Let which of the following is true?
4. f’(2)=1 B. f’(2)=3 C. f’(2)=5 D. f has no derivative at 2
   1. If f(x)= then which one of the following is equal to f’’(x)?

A. C.

B. D.

* 1. If is equal to

1. 4 B. -4 C. 12 D.
   1. Let . Then , is equal to:

A. B. C. D.

* 1. Which of the following is the equation of the line tangent to the graph of at () ?

1. C.
2. D.
   1. If then is equal to:
3. B. C. D.
   1. The equation of the line tangent to the graph of

A.8y – 3x+1=0 C.8y +3x- 1 =0

B. 3y – 8x + 1=0 D.3y+8x – 1=0

* 1. What is the simplified form of the derivative of

1. B. C. D.
   1. Which of the following is the equation of the tangent line to the graph of
2. B. C. D.
   1. Let then, what is
3. C.
4. D.
   1. If is equal to:
5. 7 B. 6 C. 4 D.3
   1. Which of the following is the second derivative of
6. B. C. D.
   1. Let is equal to:
7. B. C. D.
   1. If is equal to

A. 2 B. 7 C. 5 D.

* 1. Let and g(x)= tanx. If which of the following is equal to

1. B. C. D.
   1. **If (2008)**
2. **1 B. -1 C. 7 D.**
   1. **If (2008)**
3. **B. C. D.** 
   1. **If , which one of the following is equal to (2008)**
4. **B. C. D.** 
   1. **(2008)**

**A. B. C. 2x D. 2**

* 1. **If then the value of the derivative \_\_\_\_\_\_\_\_ (2008)**

1. **-1 B. 1 C. 2 D. does not exist**
   1. If  **(2008)**
2. B. C. D.
   1. Which one of the following is the equation of the tangent line to the graph of

at (2, f(2))?**(2008)**

1. C.
2. D.
   1. **If (2008)**
3. **C.**
4. **D.** 
   1. **If :(2008)**
5. **C.**
6. **D.** 
   1. tanx), then what is the value of
7. In2 B. 2In2 C.
   1. If then which of the following is equal to ?
8. c.
9. d.
   1. (n) (x)?
10. (n) (x)= C.
11. D.
    1. 3
12. .
    1. =2ex –ksinx + 1. If the equation of the tangent line to the graph of at (0,3) is

y = 5x+3. then what is the value of ?

1. 3 B.
   1. ?

A. 0 B. 4 C. 8 D. The limit dose not exit

**CHAPTER 4**

* 1. Suppose that equal squares are cut from each of the four corners of a square cardboard whose sides are 72 cm long.[see the figure below.] the resulting flaps are then folded up to from a box without a top. How long should be each of the four squares that has to be cut off to maximize the volume of the box?

A.6cm x

B. 12cm

C. 15cm

D. 24cm

x

* 1. Let *f*(x) = x4 – 6x2 +1 on [ -2,3 ], which of the *following* is a local maximum value of  *f*.

A.1 B. -8 C. 28 D. -7

* 1. On which of the *following* intervals does the graph of *f* (*x*) = increasing?

A. ( -, 2] B. [ -2, 2] C. [ 2, ] D. (-,)

* 1. Which one of the following is true about *f* (*x*) = *xe-x*

1. *f* has a local min at x = 1
2. The graph of *f* is concave down ward on (-, 2]
3. *f* is strictly increasing on [ 1,)
4. ( 2, *f* (2)) is not an inflection point of the graph of *f* (*x*)
   1. Let f (x) = 4 x3 – 6 x2– 9x on (-,). Which one of the *following* is NOT true?
5. *f* has local maximum at C. is the inflection point
6. *f* is concave upward on [) D. *f* is strictly increasing on
   1. On which of the *following* interval is *f* (*x*) = *x*4 – 2x2 + 10 strictly decreasing?
7. (-,0 ) B. ( -1, 0 ) C. [ 0, 1 ] D. [ 1, )
   1. .On which of the *following* interval is *f* (*x*) = (x2 + 1 ) concave downward.
8. (-,-1] [ 1, -) B. [ 0 , ) C. (-,0 ] D. [ -1 , 1 ]
   1. Which of the *following* is a local minimum point of the graph of f (x) = -3x4 + 4x3 + 12x2 +1
9. (-2 , -33 ) B. ( -1 , 4 ) C. 0 , 1 ) D. ( 2, 33 )
   1. Let f (x) = *x*4 - x3 + 6 x2for all *x*(-,) .what is the range of f(x) .

A. (- ) B. [0) C. [-9) D. ( , -9]

* 1. Which of the following is the set of all critical numbers of the function

A. {-1, 0, 1} B.{-1,1} C.{1} D. {-1,0}

* 1. Let f(x) = x|x|, for all x in (). Which of the following is true

A. f is not differentiable at x=0 C. f is differentiable only on ()

B. f’(x) = 2|x|at each x in() D. f’(x) = 2x at each x in ()

* 1. Let for all x in ().Then which of the following is true?

A. f has a minimum value at x=0 C. f is decreasing on ()

B. f is not differentiable at 0 D. f’(0)= 0

* 1. Suppose f is defined on[0,1] and f’ exist on (0,1). Then which of the following is always true

A.if f’(x)>0 for every x in (0,1),then f has absolute minimum at x=0

B. if f’(x)<0 for every x in (0,1),then f is increasing

C. if f’(x)<0 for every x in (0,1),then f is decreasing

D. if f’(x)=0, then there exist c in (0,1) such that f’(0)= f’(1)

* 1. which one of the following is the maximum value of the function

A. -2 B. 0 C. -5 D. 1

* 1. let y = |x2 +2x +1|, then what is

A.|2x+2| B.-|2x+2| C.2x+2 D. -2x – 2

* 1. Let function f is such that and differentiable for all x. which one of the following must be true?

A. C.

B. D.

* 1. Let for all x in (). Which of the following is true

A. f is not differentiable at x=0 C. f is differentiable only on ()

B. f’(x)= 2|x|at each x in() D. f’(x) =2x at eachx in ()

* 1. Which of the following is not true about on [-4,4]

A. it is increasing on [-2,2] C. Its critical numbers are -2 and 2

B. Its absolute maximum value is ¼D. Its absolute minimum value is - ¼

* 1. let . Then which of the following is true?

A. f(x) is increasing on [-1,4] C. f(x) is increasing on [4,]

B.f(x) has local minimum at 4 D. f(x) has no local maximum

* 1. If we want to construct a cylindrical can with a bottom but no top that will have a volume of 16. What is the radius of the can in meter that will minimize the amount of material needed to construct the can?

A. 4cm B. 2cm C.3cm D.1cm

* 1. The volume of a right circular cylinder is 5m3.how long should be the length of the radius of the base of the cylinder that gives the minimum surface area in meter?

A. B. C. D.

* 1. The combined perimeter of a circle and a square is 16cm. What is the radius of the circle produce a minimum total area?

A. B. C. D.

* 1. Which of the following is not true about the function defined by

A. Its graph is concave upward on C. Its graph is concave upward on

B. The inflection point of D. It has an extreme value at x = 0

* 1. Let and be a line tangent to the graph of at c in what is  the value of c for which is parallel to the chord of whose end points are and

A. 4 B. 1 C. 2 D. 3

* 1. Which of the following is not true about?

A/ f is strictly increasing on (-,1]C/ (2,f(2)) is an inflection point of the graph of f.

B/ The graph of f is concave up ward on (2,)D/ is local minimum point of f.

* 1. An object is moving along the parabola y = in *xy* – plane. At what point on its path does the object becomes closest to the point(2,0)?

1. B. (1,1) C. D. ( 2, 2)
   1. Which one of the following is necessarily true?
2. If *f ʹ*(*x*) = 0 for all x in an interval I, then *f* (*x*) = 0 for all x in I.
3. If*f* (*x*) = x2 sin *x* + 5, then there is *C* ( 0, ) such that *f ʹ*(*x*) =0
4. If *f* (*x*) = *ex*+ *x*2 is increasing on ( -)
5. If *f ʹ*(*C*) = 0, then f attains its maximum of minimum value at *x* = *C*
   1. What is the absolute maximum value of *f(x)* = 2x2 – *x*4- 4 on [ 0, 2]?
6. -3 B. 3 C. -4 D. 12
   1. A ladder 6m long rests against a vertical wall. If the bottom of the ladder slides away from the wall at a rate (speed) of m/sec, how fast is the angle between the top of the ladder and the wall changing when the angle is rad?
7. rad/sec B. rad/sec C. rad/sec D. rad/sec
   1. The number of shoes *S* that a factory can produce per day is a function of the number of hours *r* it operates:*S*(t) = 40*t* for 0 *t* 12. The daily cost *C*, in Birr, to manufacture *s* shoes is given by the function*C*(*s*) = 0.1s2 + 90s + 800. If the factory operates for 10 hours, what is the cost it incurs in producing as much shoes it can within this time?
8. Birr 400 B. Birr 1.600 C. Birr 52,800 D. Birr 124,600
   1. A company manufactures *x* computer sets per month. The monthly marginal profit ( in Birr) is given by:*p*ʹ (*x*) = 165 – 0.1 *xˏ* for 0 *x* 400.

The company is currently manufacturing 10 sets of computers per month, but is planning to increase production. What is the total change in the monthly profit if the monthly production is increased to 60sets?

1. Birr 500. B. Birr 1,865. C. Birr 8,075. D. Birr 18.635.
   1. The total cost (in Birr) of producing x radio sets per day is given by the expression

and the price per set at which they may be sold is given by 50 - What should be the daily output to obtain a maximum total profit?

1. 50 sets per day B.23 sets per day C. 10 sets per day D. 7 sets per day
   1. Let f(x) = . if *c* is a zero of *f,* that is,

*f*(*c*) = 0, then which one of the following intervals must contain *c*?

1. ( -, 0] B. [0 , 1 ] C. [ 1, 2] D. [ 2, 3 ]
   1. Which of the following is **Not true** about f(x) = 10-x3+3x?

A/ The maximum value of f in[0,∞) C/ f has local minimum value at x=1.

B/ f is decreasing is D/ (0,0) is the inflection point of the graph of f.

* 1. The sum of a number and twice another is 200. What are the numbers if their product is as large as possible?

A/ 120,40 B/ 90,55 C/ 100,50 D/ 80,60

* 1. Let *f* (*x*) = . Which one of the following is not true about *f* ?

1. Its maximum value is 1 C. Its minimum value is 0
2. *f* is increasing on ( -,0] D. *f*  is decreasing on [)
   1. A box is to have a square base, an open top, and volume of 32 m3. What is the length of the side of the base of the box that use the least amount of material?
3. 2m B. 1m C. 8m D. 4m
   1. The radius r of a right circular is increasing at a rate of 3cm/min. The height h of the one is related to the radius by h = 3r. What is the rate of change of the volume when r = 2cm?
4. 54cm3/min B. 36cm3/min C. 18cm3/min D. 81cm3/min
   1. The total cost for ordering and storing x computers are given by

birr. How many computers must be ordered to produce a minimum cost?

A/ 1000 B/ 50 C/ 100 D/ 200

* 1. Suppose f(x) is differentiable at all and the graph of y= is given as shown in the figure below. Which of the following is true?

y

A/ f(x) is increasing (-∞,3]

B/ (-2,f(-2)) is local maximum point

C/ f(x) is decreasing in [-2,4]

x

3

D/ D. f(x) is decreasing in (-

Y=

-2 4

* 1. Which of the following is the set of critical number(s) of f(x)=/x2-1/?

A/ {0} B/ {0,1} C/ {1,-1} D/ {-1,0,1}

* 1. If , then which of the following statements is true?

A/ The local minimum point of f is (-1,0) C/ 1 is the local minimum value of f.

B/ The local maximum point of f is (1,4) D/ 4 is the local maximum value of f.

* 1. An open box that has a square base and a surface area of 48 sq. units is manufactured. What dimensions will produce a box with a maximum volume?

A.x= 2 and h= 4 C. x=4 and h = 4

B. x=4 and h=2 D/ x=2 and h=8

* 1. Let then the value(s) of C in (1,4) for which f( c)= 24 is:

A . -3 B/ C/ 3 D/

* 1. A farmer sited Birr 2000 in a bank that pays 4% simple interest per annum. In how many years will his/her amount be doubled?

A/ 2 B/ 24 C/ 25 D/ 3

* 1. What are the points of closest to the point (0,2)?

A/ B/ and

C/ D/

* 1. A man bought a motor car for Birr 10,000. If the value of the car depreciates at the rate of Birr 500 per year. What is its value at the end of the 8th year (in Birr)?

A/ 14,000 B/ 6,500 C/ 6000 D/ 13,500

* 1. Which one of the following is the minimum value of f(x)= 2x-x2 on the interval [-1,3]?

A/ -3 b/ -4 C/ 1 D/ It do not have minimum value

* 1. A rectangular play ground has length 5 meters more than its width. If 1 meter is added to each side of the rectangle, the area is increased by 154 square meters. What is the length of the original ground?

1. 79m B. 77m C. 74m D. 72m
   1. The total cost for ordering and storing x units is given by

birr. How many units must be ordered to produce a minimum cost?

1. 50 B. 100 C. 300 D. 1000
   1. Which one of the following is the set of all critical numbers of

A. {} B., 2} C. {-2, 2} D. {}

* 1. On which one of the following intervals does increase?

1. ( -, -1] B.( -, 0] C.[-1, D. ( -, )
   1. The weight w of a person in kilograms and the person’s height h in meters are related by the equation if ln2=0.6, ln3= 1.1 and ln5 = 1.6, then what is the height of a person whose weight is 60kg?

A. 1m B. C. D.2m

* 1. On which of the following interval is strictly decreasing?

1. () B.(-1,0) C. (0, 1) D. (1, )
   1. Suppose f(x) is differentiable at all x and the graph of is as shown in the figure below. Which of the following is true?

y

1. f(x) increases on [3, ).
2. f(x) attains its minimum value at x=3.
3. f(x) decreases on [-1,5].
4. f(x) attains its maximum value at x=5.

-1 3 5 x

* 1. The rate of certain chemical reaction is given by for what value of x does the rate of reaction increase?

1. C.
2. D.
   1. The two positive integers whose sum is 18 and the sum of whose squares is the minimum are:

A. 8 ; 10 B. 7 ; 11 C. 5 ; 13 D. none of the above

* 1. Two real numbers whose difference is 18 and whose product is the minimum are?

A. 9 & 9 B. 1& 17 C. 9 & -9 D. 2 & 16

* 1. **A closed cylindrical can is to be made to hold 1000cm3 of oil. What are the dimension (radius r and height h) that will minimize the total surface area of the can?(2008)**

1. **C.**
2. **D .**
   1. **Let f be twice differentiable function on Which one of the following is necessarily true? (2008)**
3. **If then f has a relative extreme value at x=c.**
4. **If is increasing , then the graph of y = f(x) is concave upward.**
5. **If then f(x) = 0 for all**
6. **.**
   1. **Suppose is differentiable on and the graph of its derivative is as shown in the following figure. (2008)**

**Y**

**X**

**Which one of the following is true about ?**

1. **.**
2. **.**
3. **.**
   1. **Which one of the following is true about the function f defined by ?(2008)**
4. **C.**
5. **D.** 
   1. **The graph of has a point of inflection at: (2008)**
6. **(3, 162) only D. (0, 0) only**
7. **(4, 256) only C. (0, 0) and (3, 162)**
   1. **An object is moving along the parabola in xy-plane. At what point on its path does the object becomes closest to the point (5,0)?(2008)**
8. **(4, 4) B. (1, 2) C. (3,) D. (3, )**
   1. **What is the absolute minimum value of on the interval(2008)**

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

* 1. Consider all right circular cylinders for which the sum of the height and circumference is 30cm. what is the radius of the one with maximum volume?**(2008)**

1. 20cm B. 10cm C. D.
   1. Let if c is the zero of f, that is, f(c) = 0, then which of the following intervals must contain c?**(2008)**
2. (1, 3) B. (2, 3) C. (-2, -1) D. (-)
   1. If air is pumped into a spherical balloon at the rate of , then how fast does the radius of the sphere increase at the moment when the radius is 4cm?**(2008)**
3. 3/2cm/sec B. 2/3cm/sec C. 2cm/sec D. 1/2cm/sec
   1. 8/32/3?

A. B. {1,1} C. {

* 1. If3has local minimum at (2,
  2. At what value of x dose the function 4 attains its maximum value?
  3. A man wants to fence two identical rectangular enclosures in a field alongside a straight river as shown as shown in the following figure.

What is the maximum area of each enclosure that he can make with 192 meter fencing material if the side along the river does not need a fence?

1. 1530 m2 B. 1564m2 C. 1664m2 D. 1536m2
   1. A water tank is a rectangular parallelepiped with base length 3m,width 2m and height 2.5 m. If water is flowing in to the tank at the rate of 0.12 m3/sec, then how fast does the level of water rise up in the tank?
2. 0.02 m/sec C. 0.04 m/sec
3. 0.03m/sec D. 0.06 m/sec

**CHAPTER 5**

* 1. If , then what is the value of

A/ B/ C/ D/

* 1. Which of the following is equal to ∫ x2 sin x dx?

A/ 2cos x+2xsinx-x2cosx +c C/ 2 sinx+2cosx-x2 sinx+c

B/ 2x sinx - x2 cosx+c D/ 2x cosx-x2 sinx+c

* 1. If , then

A/ B/

C/ D/

* 1. Which of the following is equal to?

A/ +c B/ +c C/ +c D/ +c

* 1. What is the area of the region enclosed by the graph and the x – axis

between and (in sq. units)?

A. 5 B. 4 C. 3 D. 2

A. B. tan x + c C. D.

A. B. C. D.

* 1. Which of the following is the volume of a solid generated by revolving the region bounded by x – axis, x = 1 and x = 2 about the x – axis (in cubic units)?

A. B. C. D.

A. B. +c C. D. Sin x +c

* 1. Which one of the following is the area of the region enclosed by *f*(*x*) = *x, y* =

and y = 4 ( in square units)?

1. B. C. D.
   1. Let *f* be an integrable odd function on [-a ,a] for a 0. Then the value of is equal to:
2. 1 B. 2 C. 0 D. 2 *f* (a)
   1. Evaluating gives:
3. B. *xlnx* – *x* + c C. D. + c
   1. is equal to:
4. *Sin* (2*x*) + c C.
5. D.
   1. is equal to:
6. 2 B. 1 C. 0 D.
   1. What is the volume of the solid generated when the region bounded by *y*= *3x* and

*y* = *x*2 + 2 rotates about the *x*- axis?

1. cubic units B. cubic units C. cubic units D. cubic units
   1. Let \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

A/ B/

C/ D/

* 1. Which one of the following is equal to dx?

1. C.
2. D.
   1. The derivative of the function *F*(*x*) = dt is:
3. B. ln C. D. ln
   1. If *f* and *g* are continuous on and *a*, *b*, which one of the following is necessarily true?
4. If (*x*)dx, then *f*(*x*) = *g*(*x*) for all *x* [ a, b]
5. If *f* ʹ(*x*) = *g* ʹ(*x*) for all *x* [ a, b] , then
6. If f (*x*) for all [-2 , 2 ] , then
   1. What is the area of the region between the graphs of *y =* sin *x*  and x – axis where

0 x 2 ?

1. 4 B. 4 C. 2 D. 2
   1. If *f (x*) = 2*x* ( *x2* + 1 )4 , then which of the following is an anti derivative of *f (x*) ?
2. +*c*C. +1
3. +*c* D.
   1. \_\_\_\_\_\_\_\_\_\_\_\_\_

A/ B/ x+

C/ D/ x+/1-x/ + C

* 1. The area enclosed by the graph of f(x)= /x/ and the x-axis between the lines x=-2 and x=1 (in sq. units) is:

A/ B/ 3 C/ 2.5 D/ 4

* 1. What is the volume of the solid of revolution generated when the region enclosed by the curve y=ex, the y-axis and the line y=e rotates about the y-axis (in cubic units)?

A/ B/ C/ D/ π

* 1. Evaluating dx gives:

1. B. C. D.
   1. Let f be a function which is continuous on [-a,a] for any real number Then which one of the following statements is not true?

A/ C/ If f is even function, then

B/ f(x) is integrable on [-a,a]D/ If f is odd function, then

* 1. What is the value of

A/ -5/6 B/ -1/2 C/ ½ D/ 1/6

* 1. If \_\_\_\_\_\_\_\_\_\_

A/ 2x2+3x-15+c B/

C/ x3+x2-15x+c D/ x3-x2 +15x+c

A/ B/ C/ D/ 6

* 1. Which of the following is an anti-derivative of the function

A/ 1- 𝓁n/x-1/ B/ x-𝓁n /x-1/ C/ 𝓁n D/ 1+𝓁n /x-2/

A/ B/ C/ D/

* 1. dx=\_\_\_\_\_\_\_\_\_\_\_\_

A/ e-1 B/ 2(e-1) C/ 2e D/ e

* 1. \_\_\_\_\_\_

A/ 1 B/ - 1 C/ -1 D/ ½

* 1. What is the value of dx?

A. B. C. 1 D. -

* 1. What is the area under the curve y = 3sinx over the interval [0,]?

A. 3\2 square units B.7\3 square units C. 9\2 square unitsD. square units

* 1. is equal to:

1. B. C. D.
   1. An anti derivative of
2. B. C. D.
   1. What is the derivative of
3. C.
4. D.
   1. What is the area of the region between the graph of
5. B. C. D.
   1. Which one of the following is equal to

B. C. D.

* 1. What is the area of the region between the graph of and the x-axis from x=0 to x=3?

A. B. C. D.

* 1. Which one of the following is equal to

1. C.
2. D.
   1. If F(x) is an antiderivative of and F(1)=0, then F(2) is equal to:
3. 0 B. C. D.3
   1. Which one of the following is equal to
4. C.
5. D.
   1. What is the area of the region between the graphs of
6. 3 B.2 C. D.
   1. Which one of the following is equal to
7. C.
8. D.
   1. What is an antiderivative of
9. B. C. D.
   1. What is the value of
10. B. C. D.
    1. Which one of the following is equal to
11. C. ln|x|-ln|1
12. D.
    1. Which of the following is the area of the region enclosed by the graph of on the

interval [1, 4]?

1. 14/3 B. 28/3 C. 15/2 D. 7
   1. What is the value of
2. B. C. D.
   1. Which one of the following is the value of
3. B. C. D.
   1. Which one of the following is the volume of the solid obtained when the graph of is rotated about the x-axis?
4. B. **C.**  D.
   1. When evaluated
5. C.
6. D.
   1. Which one of the following is an antiderivative of
7. **B. C. D.** 
   1. The volume of the solid which is generated when the region bounded by and the x-axis from x=0 to x= 2 is rotated about the x-axis is equal to
8. B. C. D.
   1. **If then which of the following is an anti-derivative of ?(2008E.C)**
9. **C.**
10. **D.** 
    1. **Which one of the following is equal to (2008E.C)**
11. **C.**
12. **D.**
    1. **The volume of the solid generated when the region bounded between the graph of**

**and x-axis is rotated about the x-axis is:(2008E.C)**

1. **B. C. D.** 
   1. **The value of (2008E.C)**
2. **B. C. D.**
   1. **(2008E.C)**
3. **21/2 B. 14/3 C. 7 D. 16/3**
   1. **Given , then (2008E.C)**
4. **B. C. D.** 
   1. **The value of (2008E.C)**
5. **C.**
6. **D.** 
   1. **The volume of a cylindrical tin can with a top and a bottom is 16 cubic inches. If a minimum amount of tin is to be used to construct the can, what must be the height of the can in inches?(2008)**
7. **B. C. 4 D. 8**
   1. **The area of theregion enclosed by the graphs of (2008)**
8. **2/3 B. 4/3 C. 2 D. 14/3**
   1. **What is the area of the region between the graph of (2008)**
9. **2/3 B. 7/3 C. 3 D. 2**
   1. **The area of the region bounded by the curve , the x-axis, the y-axis, and the line x= 2 is:**
10. **B. C. D.** 
    1. **If F and f are continuous functions such that then (2008)**
11. **C.**
12. **D.** 
    1. **The region is enclosed by the graph of , the line x =2, and the x-axis is revolved about the y-axis. The volume of the solid generated is:(2008)**
13. **B. C. D.** 
    1. -t
14. B-x
    1. What is the value of
    2. What is the value of dx?
15. xe+ex+1)+c C. x+1)e +x+1)+c
16. xe+ex) +c D. e+1x+1) +c
    1. If the region enclosed by the graphs of 2 and 3 from x=0 to x=1 rotates about the what is the volume of the solid of revolution?
    2. **-t**
17. **B-x**
    1. **What is the value of**
    2. What is the area of the region bounded by the lines 2x ?

**CHAPTER 6**

* 1. Suppose *p*(1,2,1) and *Q*(1,0,2) are points in space and . If is parallel to and is parallel to and . = -10, then which one of the following is true?

1. and has the same direction C. =
2. =10 D. =2
   1. Which one of the following points is closer to the sphere
3. (1, 0, 0 ) B. ( 0, 0, 0 ) C. ( 0, -1, 0 ) D. ( 0, 0, -1 )
   1. If (-1, 2, 2) and ( 1, 0, -2) are endpoints of a diameter of a sphere, then which one of the following is true about the sphere?
4. ( 0, 1, 0 ) is a point on the sphere
5. The equation of the sphere is *x*2 + ( *y* – 1)2 + *z*2 = 6
6. The equation of the sphere is *x*2 + ( *y* – 2)2 + *z*2 = 6
7. The radius of the sphere is 6
   1. Suppose that the equation *x*2 + *y*2 + *z*2 + 2*x* + 8*z* = 6(*y* + 1), represents a sphere. Where is the point (1, -1, 4) located relative to the sphere?
8. Inside the sphere, C. At the center of the sphere
9. On the sphere D. outside the sphere
   1. Suppose is the line through the center of the sphere *x*2 + *y*2 + (*z* – 2)2 = 9 and the intersects sphere at (1, 2, 4).

What is the cosine of the angle between and positive z- axis?

1. B. C. D.
   1. If *P* = ( 3, - 1, + 2 ) and *Q* = ( 2 + 1, 3, 3 ) are points in space, what should be the value (s) of so that the distance between the two points is 6 ?
2. = -2 or = 5 C. = -1 or = 3
3. = 0 or = 5 D. = -3 or = 2
   1. Which of the following is the radius of the sphere whose equation is

A/ 0 B/ 2 C/ 3 D/ 1

* 1. For what value of d is the sphere of radius 7 units?

1. -14 B. -10 C.7 D.10
   1. Which of the following is a point of intersection of the sphere and the y- axis?
2. (0,-2, 0) B. (0,2, 0) C.(0, -4, 0) D.(0, 4, 0)
   1. If the line is tangent to the sphere whose equation is:

, then what is the distance of the line from the center of the sphere?

A.2 B. 3 C. D. 4

* 1. If a sphere with center C(0,1, 1) intersects the z-axis at p(0,0,3), then the radius of the sphere is equal to

A. 5 B. 3 C. D.

* 1. Suppose A and B are the end points of a diameter of the sphere whose equation is

. If A=(1, 0, -2), then B is equal to

1. (1, 0, -2) B.(0, 0, -1) C. (-1, 0, -2) D. (0, -1, -2),
   1. Let *l1* and *l2* be two lines in space intersecting at the origin, (0,0,0). If *l1* and *l2* pass through point A(1,1,0) and B(0,1,1), respectively, then the angle between *l1 and l2 is equal to*
2. 300 B.450 C. 600 D. 900
   1. **Let the angle between where P and Q are points in space. If then what is that distance between P and Q?(2008)**
3. **B. 5/4 C. 4/5 D. 4/3**
   1. **If one of the end point of the line segment is (3, 2, -4) and the midpoint is (4, 1, -2), then the coordinate of the other end point is:(2008)**
4. **(5, 0, 0) B. (2, 0, 5) C. (5, 1, 2) D. (3, 1, 0)**
   1. What is the image of the circle x2+y2-4x-6y+11=0, when the origin is shifted to the point (1,1) after translation of axes?
5. C.
6. D.
   1. If the point ( is on the sphere centered at (1, 2, 3) with radius 2, what is the value of?
7. 0 B. 1 C. 2 D. -3
   1. Consider a rectangle ABCD with base vertices A= (0, 3) and B= (4, 0) and the other vertices, C and D, in the first- quadrant of the coordinate plane. If its height is half of the length of its base, then which of the following indicates the coordinates of vertex C?
8. (4,5/2) B. (6, 3/2) C. (5/2,-2) D. (11/2,2)

**CHAPTER 7**

* 1. Consider the formula for a natural number *n*:

2 + 4 + 8 + ... + 2*n* = 2n+1 + 1

To proof this formula a person has used the following argument. “***Assume the formula is true for n = k, for some k . Then the person has shown that the formula is also true forn = k + 1. And then, the person has concluded that, by the principle of mathematical induction,the formula is true for all natural numbers n*** ” Which one of the following statements is True about the above arguments?

1. The formula holds true through it does not work for *n* = 1.
2. Since the left – hand- side is an even number and the right- hand – side an odd number, the principle               of mathematical induction is False.
3. This is one example where the principle of mathematical induction fails to work.
4. The above formula does not work for all natural numbers ***n .***
   1. Which of the following statements is not true?

A/ If x and y are even integers, then xy is also even. C/ If 3n+2 is odd, then n is odd.

B/ The sum of two consecutive integers is a multiple of 4.D/

* 1. **The valid conclusion from the premises: (2008E.C)**

1. **C.**
2. **D.** 
   1. **Which one of the following is a valid assertion that can be proved by the principle of mathematical induction?(2008E.C)**
   2. **Consider the following assertion of a person and his proof.(2008E.C)**

**“ If x and y are equal to positive integers, then .”**

**Proof: the following steps and reasons are used to proof the assertion.**

**Step Reason**

1. **given hypothesis**
2. **Multiply both sides of (1) by x**
3. **Subtract from both sides of (2)**
4. **factor both sides of (3)**
5. **divided both sides of (4) by x-y**

**Step 5 completes the proof.**

**Which one of the following is true about this proof?**

1. **It is a correct direct proof of the assertion.**
2. **It follows the technique of a proof by contradiction because the steps lead to a contradiction.**
3. **The proof is invalid because step 4 does not lead to 5**
4. **The proof is invalid because step 4 does not follow from step 3**
   1. **(2008E.C)**
5. **25 B. 23 C. 19 D. 17**
   1. **To show for a mathematical statement , which proof**

**type is appropriate?(2008E.C)**

1. **Direct proof A. indirect proof**
2. **Showing by counter example D. proof by contradiction**
   1. n - 2 is prime that can be proved or disproved by which one of the following mathematical proofs?
3. Direct proof C. Disprove by counter example
4. Proof by exhaustion D. proof by contradiction
   1. Which one of the following is a valid assertion that can be proved by the principle of mathematical induction?
5. n, for every integer
6. n> for every integer
7. 2n, for every
8. 3
   1. Which of the following is a correct assertion that can be proved by the principle of mathematical induction?
9. m, for each positive integer
10. 2p is prime for each prime integer
11. 2k ,for each integer k 4.

**The end**

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