STA-100 Paper 2019

STA-100

General Mathematics & Biostatistics

| Past PApers (Till mids)|

Prepared by:

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STA-100 Papers_2019

Objective

1) **A(4,3) B(10,7);** ***find the mid point***

2) $4\begin{bmatrix} 2 & 0 \\ 4 & -1 \end{bmatrix}\begin{bmatrix} 8 & 0 \\ 16 & -4 \end{bmatrix}$

3) **If b^2-4ac<zero then** ***there will be No Solution***

Subjective

1) **You have 5 chess cards named A,B,C,D,E . In how many ways you can arrange them to make a word from them (in this question we have to find possible number of permutations) (2 marks)**

5! = 5×4×3×2×1 = 120

2) **Find the exact value of Cos150 without using calculator. (3 marks)**

Cos(180^0-$Cos30^0$)

By applying angle rule

Cos[$2(90))^0$-$Cos30^0$]

-Cos(-30^0)

$-Cos30^0 = -\frac{\sqrt{3}}{2}$

3) **If f(x)=4x+1 and g(x)=x-6 then find f(x)-g(x).(2 marks)**

f.g(x)= f(x) × g(x)
f.g(x)= (4x+1)(x-6)
f.g(x)= [4x(x)+4x(-6)+1(2x)+1(--6)]
f.g(x)= [$4x^2$-24x+2x-6]
f.g(x)= ($4x^2$-22x-6)

4) **Write the equation in complete square form , x^2 +4x+2 .(3 marks)**

$x^2 + bx + \left(\frac{b}{2}\right)^2 + 2 - \left(\frac{b}{2}\right)^2$

$x^2 + bx + \left(\frac{16}{4}\right) + 2 - \left(\frac{4}{2}\right)^2$

$x^2 + 4x + \left(\frac{16}{4}\right) + 2 - (2)^2$

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$x^2 + 4x + 4$

$(x+2)^2$

5) .(2-4i)(3+5i)

2(3+5i)-4i)(3+5i)

$6+10i-12i-20i^2$

6-2i-20(-1)

6-2i+20

26-2i

6) .a=3000, r= $\frac{1}{2}$ find the a_{10}

2(3+5i)-4i)(3+5i)

.a=3000, r= $\frac{1}{2}$ *find the*

$a_{10} = a_1 r^{10-1}$

$a_{10} = (3000)(r^9)$

$a_{10} = (3000)(\frac{1}{2})^9$

$a_{10} = (\frac{3000}{2^9})$

7) A club has five seniors and three junior players . For and upcoming tournament they have to make a team of two juniors and two seniors. how many possible number of teams they can make (this question is from combinations) (5 marks)

$${}^{r}P_{s} = {}^{2}P_{2} = \frac{2!}{2-2!} = \frac{2!}{0!} = \frac{2*1}{0!} = \frac{2}{1} = 2$$

8) If *f(x)= 3x-1* and *g(x)= 2x-1* then find the product of i.e, *f.g(x)*

*f.g(x)= f(x) * g(x)*

f.g(x)= (3x-1)(2x-1)

f.g(x)= [3x(2x)+3x(-1)-1(2x)-1(-1)]

f.g(x)= [6x²-3x-2x+1]

f.g(x)= [6x²-5x+1]

9) *Fg(x)*

fx()= x³+1

g(x)= 3²+1

Same method will be used as above;

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***10)* Expand the *Sin*(A-B)**

Sin(A-B) = ***(****Sin*A+(-B)***)***

Sin(A-B) = *Sin*A+*Cos*(-B) + *Cos*A+*Sin*(-B)

Sin(A-B) = *Sin*A+*Cos*(B) + *Cos*A+*Sin*(-B)

Sin(A-B) = *Sin*A+*Cos*B - *Cos*A+*Sin*B

***11)* Write down the properties to reduce a metric to reduce echelon form.**

Definition:

"A matrix is in ***echelon form*** *if it has the following properties"*

- *Every non-zero row begins with a 1 (called a* ***leading*** *1)*
- *Every leading one in a lower row is further to the right of the leading one above it.*
- *If there are zero rows, they are at the end of the matrix*

Example;
$$\begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 2 \\ 0 & 0 & 1 \end{bmatrix}$$

Definition:

A matrix is in ***reduced echelon form*** *if in addition to the above three properties it also has* ***t****he following property:*

- *Every other entry in a column containing a leading one is zero*

Example;
$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

***12)* If Z=2-B*i* find out Z.Z*=?**

Z=2-B*i* Z*=2+B*i*

Then,

Z.Z*= (2-B*i*)(2+B*i*)

Z.Z*= [2(2)+1(B*i*)-B*i*(2)-B*i*(B*i*)]

Z.Z*= [4+B*i*-2B*i*-Bi^2]

Z.Z*= [4+(1-2)B-B(-1)]

Z.Z*= [4+(-1)B+B]

Z.Z*= [4-B+B]

Z.Z*= 4

***13)* What is the cardianality of Sets?**

A= set of English alphabets

B= set of integers

C= set of even number between 3 and 7

A= {a,b,c,d,……,z}

Caridanility of set A is |A|= **26**

B= {0,±1, ±2, ±3,…..}

(Set B *is a infinite there for its caridanility can't be counted)*

Caridanility of set B is |B|= **is uncountable**

C= {4,6}

Caridanility of set C is |C|= **2**

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14) Find the slope of *2x-3y= 12*

2x-3y= 12
2x-3y-12 = 0

Slope = $-\frac{a}{b} = -\frac{2}{-3} = \frac{2}{3}$

Intercept= $-\frac{C}{b} = -\frac{-12}{-3} = -\frac{12}{3}$

15) Find Domain & Range *for f(n)= 5n+2*

Domain = $\{x \in R \mid x \geq 2\}$ R, Range= R

16) Radius of Circle *$(x-5)^2 - (y-7)^2 = 4a$*

$(x-5)^2 - (y-7)^2 = 4a$

Center equation of a circle

$(x-k)^2 - (y-h)^2 = r^2$

$(x-5)^2 - (y-7)^2 = 7^2$

17) Find the slope of *(2, -1)* and *(-5, 3)*

$m = \frac{y_2 - y_1}{s_2 - s_1}$

$m = \frac{3-(-1)}{-5-2}$

$m = \frac{3+1}{-7}$

$m = \frac{4}{-7}$

18) *$.x^2+6x-3=0$* ,find value of using "*Quadratic equation*"

Quadratic formula = $\frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$\frac{-b \pm \sqrt{b^2-4ac}}{2a} = \frac{-6 \pm \sqrt{6^2-4(\ )(\ )}}{2a}$

19) *$.tx^2+3x-7=0$* ,find value of "x"

$.tx^2+3x-7=0$

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$.tx^2+3x=+7$

divide by "t" on both sides

$.x^2+\frac{3}{t}=\frac{7}{t}$

$.x^2+2\frac{3}{2t}+(\frac{3}{2t})^2=\frac{7}{t}+(\frac{3}{2t})^2$

$(x+\frac{3}{2t})^2=\frac{7}{t}+(\frac{9}{4t^2})$

$(x+\frac{3}{2t})^2=(\frac{28t+9}{4t^2})$

$\sqrt{(x+\frac{3}{2t})^2}=\sqrt{(\frac{28t+9}{4t^2})}$

$.x+\frac{3}{2t}=\pm(\sqrt{\frac{28t+9}{4t^2}})$

$.x+\frac{3}{2t}=\frac{-3\pm\sqrt{28t+9}}{2t}$

20) **A= {2,4,6,8,10,12,14,16}**
B={12,14,16,20}
find **A∩B**

A∩B= {2,4,6,8,10,12,14,16} ∩ {12,14,16,20}
A∩B= {12,14,16}

21) **$A_0=2$, $a_1=3$, $a_2=-2$, $a_3=1$**

$\sum_{2=0}^{2} 2a = 2(a_0+a_1+a_2)$
$=2(2+3+(-2))$
$=2(3)$
$=6$

22) **$A=\begin{bmatrix}1&2&1\\2&1&2\\3&1&3\end{bmatrix}$ $B=\begin{bmatrix}2&2&3\\2&1&1\end{bmatrix}$, is multiplication possible**

Order of A= 3 × 3
Order of B=2 × 3
For the multiplication
Number of Columns in A = Number of rows in B
Here,
3≠2
SO, multiplication is not possible.

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23) **A local family Restaurant have special breakfast and a customer choose one of them each day**

Egg Chicken	Mango, Orange	Orange
Egg mutton	Apple fruit Slice	Rasberry
Egg beef	Cup fruit juice	Tomato

Find the possible combination without meet.

Since we have to make combination without meet,

$${}^{3}P_{3} = \frac{3!}{3-3!} = \frac{3!}{0!} = \frac{3*2*1}{0!} = \frac{6}{1}$$

24) $x^2+6x+5=0$

$x^2+6x+5=0$

$x^2+1x+5x+5=0$

$x(x+1)+5(x+1)=0$

$(x+5)+(x+1)=0$

$(1+x)+(1+5)=0$

$(x+1)=0$ $\qquad$ $(x+5)=0$

$x=-1$ $\qquad$ $x=-5$

$S.S=\{-1, -5\}$

25) **If 3rd and 4th terms of geometric series are 12 & B respectively. Find out the sum to infinite.**

Thank You !

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