The Brigade School- Revision Test (2020 - 21)

Total points 34/40

Mathematics Std: X .Marks : 40

Email address *

mananmehtabatman@gmail.com

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Name *

Manan Y Mehta

Name of the School *

- ○ TBSM
- ○ TBSW
- ◉ TBSG

Class / sec *

10A

Question 1 10 of 10 points

✓ i) In an A.P , If Tn = 4, d = 2, Sn = -14 ; Find n and a. * 3/3

- ○ n=8,a=7
- ◉ n=7,a=-8 ✓
- ○ n=7,a=2

Feedback

Given , Tn= 4, d=2 and Sn=-14.
a+ (n-1) d= 4
a+(n-1)2=4
a=4-(n-1)2=6-2n (1)
Given, Sn=-14
n/2 (a+Tn) =-14
n/2 (6-2n+ 4) = -14
simplifying , n^ -5n -14 =0 (1)
On solving, we get n=7 , n= -2
taking n=7,a= -8
ANS: n=7,a=-8 (1)

✓ ii) Show that (x-1) is a factor of x^3 - 7x^2 + 14x - 8 hence completely factorize the above expression. * 3/3

- (x-1)(x-2)(x-4) ✓
- (x-1)(x-2)(x+4)
- (x-1)(x+2)(x-4)

Feedback

Let p(x)= x to the power 3 -7x^+14x - 8
By factor theorem, if (x -1) is a factor of P(x), P(1)=0 (1m)
Here P(1)=1-7+14-8=0
Hence (x-1) is a factor of P(x). (1m)
Now, Dividing P(x) by (x-1), we get quotient = x^-6x+8
On factorising: x^-6x+8 = (x -2) (x-4)
Hence ANS: (x-1)(x-2)(x-4) (1m)

✓ iii) If A=■(0&-1@2&5), B=■(1&3@6&4), c= ■(1&0@-3&-2) , find A(B+C) * 4/4

- ■(-3 & -2 @ -19 & -16)
- ■(-3 & 2 @ 19 & 16)
- ■(-3 & -2 @ 19 & 16) ✓

Feedback

B+ C = ■(1&3@6&4) +■(1&0@-3&-2)
= ■(2&3@3&2)
A(B+C)= ■(0&-1@2&5) X ■(2&3@3&2)

= ■(0x2+-1x3 & 0x3+-1x2 @ 2x2 + 5x3 & 2x3+ 5x2)

= ■(-3 & -2 @ 19 & 16)

Question 2 10 of 10 points

✓ i) Using properties of proportion, find the value of solve : * 3/3

$$\frac{\sqrt{5}+\sqrt{5-x}}{\sqrt{5}-\sqrt{5-x}}=3$$

- ○ x=4/15
- ◉ x=15/4 ✓
- ○ x=25/4

Feedback

(√5 +√(5-x))/(√5 -√(5-x)) = 3/1
Applying Componendo and dividendo , and simplifying we get, (√5)/(√(5-x)) =2 (2m)
Cross multiplying and squaring, we get, 5= 4(5-x)
X=15/4 (1m)
ANS: x=15/4

✓ ii) Mrs. Sheila Sarin deposited Rs. 1500 per month in a Recurring deposit scheme of a bank 9 months. If she gets Rs. 675 as interest at the time of maturity, find the rate of Interest, if the interest is calculated at the end of each month. * 4/4

- ○ Rate of interest = 12% , The maturity value = Rs 18,675
- ◉ Rate of interest = 12% , The maturity value = Rs 14,175 ✓
- ○ Rate of interest = 14% , The maturity value = Rs 18,675

Feedback

Given : SI=Rs 675
Time for which money is deposited = 9 months.
Money deposited per month= Rs 1,500
P=Rs 1,500, n=9 months then,

S I = [p X (n(n+1))/2x12]x r/100
Substituting and solving, we get r= 12%
Hence rate of interest =12% per annum. (1m)
The total money deposited = 1500 x 9= Rs 13,500 (1m)
Therefore, the maturity value = Rs 13,500+ Rs 675= Rs 14,175 (1m)
Ans:i) Rate of interest = 12%
The maturity value = Rs 14,175 (1)

✓ iii) Solve the inequation -2 ⅔ ≤ x + ⅓ < 3⅓ , x∈ Z * 3/3

- { - 3, -2,-1,0,1,2,3}
- {-3, -2,-1,0,1,2} ✓
- {-2,-1,0,1,2, 3}

Feedback

-2 2/3 ≤ x+ 1/3 < 3 1/3 x ϵ Z

-8/3 -1/3 ≤ x
-9/3 ≤ x
-3 ≤ x .....(1)

x < 10/3 -1/3
x < 9/3
x<3 .....(2)
-3 ≤ x< 3 xϵ Z
ANS: X={ -3, -2,-1,0,1,2}

Question 3 8 of 10 points

✓ i) How many three digit natural numbers are divisible by 7 * 2/2

- ○ 142
- ○ 114
- ◉ 128 ✓

Feedback

Sol: 3 digit natural numbers divisible by 7 are 105,112, 119,……994
This is an AP with a= 105 and d= 7.
Now Tn = 994
a+ (n-1)d= 994
105 + (n-1) 7 = 994
(n-1)7=994-105=889
Solving, n= 128
Ans: n= 128

✓ ii) A retailer purchases an air conditioner for Rs. 35,000 from a company. He sold it to a consumer at a profit of Rs. 5,000. Calculate the tax liability of the retailer if the GST rate on air conditioner is 28% * 2/2

- ○ Rs. 9800
- ◉ Rs. 1400 ✓
- ○ Rs. 11,200

Feedback

Sol: For the retailer :
C.P = Rs 35,000
Input GST= 28%x35000=Rs 9800
that is input tax credit = Rs 9800
Selling price = Rs 35000+5000= Rs 40,000
Output GST= 28% of 40,000=Rs 11200
Tax liability = Output GST - input tax credit
= 11200-9800
=Rs1400
ANS: Tax liability of the retailer is Rs 1400
Method 2:
Tax Liability of the retailer
= Tax on value addition , i.e , Tax on profit
= 28% of Rs. 5000 = Rs. 1400

✓ iii.) The value of P for which the roots are real and equal for the equation Px^2-4x+3 is ____ * 2/2

- (●) 4/3 ✓
- ( ) -3/4
- ( ) 3/4

Feedback

For a quadratic equation ax^+bx+c=0, if the roots are real and equal, Discriminent D= b^-4ac=0
here a= p,b=-4,c=3
16- 4xpx3=0
on solving we get p=4/3
Ans: p=4/3

✓ iv) 50 is divided into two parts that the sum of their reciprocals is 1/12, find the two parts * 2/2

- ( ) 12, 38
- ( ) 10, 40
- (●) 30 ,20 ✓

Feedback

let the required parts be x, (50-x)
1/x + 1/(50-x) =1/12

solving , (50-x)+x / x(50-x) = 1/12
50/50x-x^ = 1/12
*600= 50 x - x^*
x^-50x+600=0
solving by factorising , x=30,20
Ans: the required parts are x, 50-x
that is 30 and 20.

✗ v) Let M be a matrix such that M X matrix ■(2&1@0&3) = matrix [4 - 7]; a) State the order of m ; b) Find m * 0/2

- ○ 1x2 ; [-3 2]
- ◉ 2x1 ; [2 -3] ✗
- ○ 1x2 ; [2 -3]

Correct answer

- ◉ 1x2 ; [2 -3]

Feedback

i) to find the order of matrix M, let the order be axb
order of second matrix is 2x2 and the order of [4 -7] is 1x2
the product of matrix is possible , only when the number of columns in the first matrix is equal to the number of rows in the second.
b= 2 and the number of rows or resulting matrix is equal to 1, so
a= 1
the order of M is 1x2
ii) let M=[x y]
[x y] [2 1] = [4 -7]
[0 3]

[2x x+3y] =[4 -7]

x=2, x+3y=-7 and therefore , y=-3

ANS: M= [2 -3]

Question 4 6 of 10 points

✓ i) A cylindrical cistern whose diameter is 14cm is partially filled with water. If a conical block of iron whose radius of the base is 3.5 cm and height 6 cm is wholly immersed in the water, by how much will the water level rise ? (Take π = 22/7) * 3/3

- ○ 0.2 cm
- ◉ 0.5 cm ✓
- ○ 0.35 cm

Feedback

For cone, r=3.5 = 7/2 cm, h = 6 cm
Volume of the cone = 1/3πr^h = 1/3 X 22/7 X 7/2 X 7/2 X 6 = 77cm^3
Radius of cistern = 7cm
Volume of the water in the cistern cylinder = πr^h,
22/7 X 7 X 7 X h = 77 --> h = 77 X 7 / 22 X 7 X 7 = 1/2 = 0.5
hence, the water level will rise to a height of 0.5cm .

✕ ii) If A= ■(3&1@-1&5) and I = ■(1&0@0&1) find A^2 - 4A + 4I * 0/4

- ○ ■(8&8@-8&24)
- ○ ■(0&4@-4&8)
- ◉ ■(0&8@-8&0) ✕

Correct answer

- ◉ ■(0&4@-4&8)

Feedback

Ans: A^ = ■(3&1@-1&5) x ■(3&1@-1&5) = ■(3 x3+1x-1&3x1+1x5@-1x3+5 x-1&-1x1+5x5) =■(8&8@-8&24)

-4A= (-4) ■(3&1@-1&5)
= ■(-12&-4@4&-20)
4I= 4 x ■(1&0@0&1)
= ■(4&0@0&4)

A^ - 4A + 4I=■(8&8@-8&24)+ ■(-12&-4@4&-20) + ■(4&0@0&4)
= ■(0&4@-4&8)

✓ iii)A manufacturer of TV sets manufactures a particular brand of TV set and marks it at Rs 70,000. He then sells the TV set to a wholesaler (in Patna) at a discount of 30%. The wholesaler sells the TV set to a dealer (in Agra) at a discount of 20 % on the marked price. If the rate of GST is 28%, find the tax paid by the wholesaler to the central - government. * 3/3

- (●) Rs 1960 ✓
- ( ) Rs. 2100
- ( ) Rs 1560

Feedback

There is an inter State transaction.
The rate of GST on each transaction of machine is 28%
For the manufacturer, MP= Rs 70,000
SP = Rs70,000-30% of 70,000=Rs 49,000
For the wholesaler,
CP= Rs 49,000
SP= rs 70,000- 20% of 70,000= RS.56,000

Tax paid by the wholesaler to the central Government =Output tax - Input tax
28% of 56,000 - 28% of 49,000
= 7000x 28/100
= Rs 1960

ANS: Tax paid by the wholesaler to the Central GOVT Rs 1960

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