



## Progressions Questions for NMAT

All rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, or stored in any retrieval system of any nature without the permission of cracku.in, application for which shall be made to [support@cracku.in](mailto:support@cracku.in)

### Instructions

For the following questions answer them individually

### Question 1

The product of three positive numbers is 64. What is the minimum value of the sum of the three numbers?

- A 10
- B 14
- C 12
- D None of the above

**Answer:** C

### Explanation:

AM  $\geq$  GM  $\Rightarrow$

Let the three numbers be a, b and c.

$$(a+b+c)/3 \geq a * b * c^{1/3}$$

$$a*b*c=64$$

$$(a+b+c)/3 \geq 64^{1/3} \Rightarrow$$

$$a+b+c \geq 4*3 = 12$$

### Question 2

What is the sum of the first 25 terms of the series 1, 4, 11, 24, 45, ...?

- A 12455
- B 37895
- C 32986
- D 35425

**Answer:** D

### Explanation:

If the first order difference is constant, we can assume the terms of the series as  $(an + b)$

If the second order difference is constant, we can assume the terms of the series as  $(an^2 + bn + c)$

If the third order difference is constant, we can assume the terms of the series to be  $(an^3 + bn^2 + cn + d)$  and so on.

The first order differences of the given series are 3, 7, 13, 21, ...

The second differences of the given series are 4, 6, 8, ...

The third order differences of the given series are 2, 2, 2, ... which is constant.

So, the nth term of the series can be written as  $an^3 + bn^2 + cn + d$

Substituting the values n = 1, 2, 3 and 4, we get

$$a+b+c+d = 1$$

$$8a+4b+2c+d = 4$$

$$27a+9b+3c+d = 11$$

$$64a+16b+4c+d = 24$$

$$\Rightarrow 7a+3b+c = 3$$

$$\Rightarrow 19a+5b+c = 7$$

$$\Rightarrow 37a+7b+c = 13$$

$$\Rightarrow 12a+2b = 4$$

$$\Rightarrow 18a+2b = 6$$

$$6a = 2 \Rightarrow a = 1/3$$

$$b = 0$$

$$c = 3 - 7/3 = 2/3$$

$$d = 0$$

So, the nth term is  $(1/3)n^3 + (2/3)n$

Sum upto n terms is given by  $(1/3)\binom{n \times (n+1)}{2}^2 + (2/3)\binom{n \times (n+1)}{2}$

So, the sum of the first 25 terms =  $(1/3)*25*25*26*26/4 + (2/3)*25*26/2$

$$= 35425$$

### Question 3

What is the sum of the first 20 terms of the series 1, 3, 7, 13, ...?

- A 1390
- B 2350
- C 2680
- D 2580

Answer: C

### Explanation:

The differences of the terms are - 2, 4, 6, 8, ...

The differences are in AP

Let the nth term of the series be  $an^2 + bn + c$

Putting n = 1,  $a+b+c = 1$

Putting n = 2,  $4a+2b+c = 3$

Putting n = 3,  $9a+3b+c = 7$

$\Rightarrow 3a+b = 2$  and  $5a+b = 4$

$\Rightarrow 2a = 2 \Rightarrow a = 1$  and  $b = -1$  and  $c = 1$

So, the nth term is  $n^2 - n + 1$

Sum of n terms =  $\sum n^2 - n + 1$

$$= \frac{n(n+1)(2n+1)}{6} - \frac{n(n+1)}{2} + n$$

Sum of the first 20 terms =  $20 \cdot 21 \cdot 41/6 - 20 \cdot 21/2 + 20 = 2680$

Take NMAT Mocks here (Adaptive pattern)

Question 4

What is the sum of the series  $1 + \frac{2}{4} + \frac{3}{8} + \frac{4}{16} + \dots$ ?

- A  $\frac{5}{2}$
- B  $\frac{9}{8}$
- C  $\frac{6}{5}$
- D None of the above

Answer: A

Explanation:

Let the sum be S

$$S = 1 + \frac{2}{4} + \frac{3}{8} + \frac{4}{16} + \dots$$

$$\frac{S}{2} = \frac{1}{2} + \frac{2}{8} + \frac{3}{16} + \dots$$

$$S - \frac{S}{2} = \frac{S}{2} = 1 + \left(\frac{1}{8} + \frac{1}{16} + \frac{1}{32} + \dots\right)$$

The series inside ( ) forms a GP and can be calculated using the sum of infinite GP.

$$\text{Hence, } \frac{S}{2} = 1 + \frac{1}{8} \cdot \frac{1}{1 - \frac{1}{2}}$$

So,  $S = 5/2$

Question 5

The 288th term of the series a,b,b,c,c,c,d,d,d,e,e,e,e,f,f,f,f... is

CAT[2003] (L)

- A u
- B v
- C w
- D x

Answer: D

Explanation:

1, 2, 3, 4, ..., n such that the sum is greater than 288. If  $n = 24$ ,  $n(n+1)/2 = 12 \cdot 25 = 300$ . So,  $n = 24$ , i.e. the 24th letter in the alphabet is the letter at position 288 in the series. So, answer = x

Question 6

If the sum of the first 11 terms of an arithmetic progression equals that of the first 19 terms, then what is the sum of the first 30 terms?

CAT[2004]

- A 0
- B -1
- C 1
- D Not unique

Answer: A

Explanation:

Sum of the first 11 terms =  $11/2 (2a+10d)$

Sum of the first 19 terms =  $19/2 (2a+18d)$

$\Rightarrow 22a+110d = 38a+342d \Rightarrow 16a = -232d \Rightarrow 2a = -232/8 d = -29d$

Sum of the first 30 terms =  $15(2a+29d) = 0$

Get 5 NMAT at just Rs. 499

Question 7

For a Fibonacci sequence, from the third term onwards, each term in the sequence is the sum of the previous two terms in that sequence. If the difference in squares of 7th and 6th terms of this sequence is 517, what is the 10th term of this sequence?

CAT[2001]

- A 147
- B 76
- C 123
- D Cannot be determined

Answer: C

Explanation:

Let  $z$  and  $y$  be the 1st and 2nd term respectively. So 6th and 7th term would be  $2x+3y$  and  $5x+8y$  respectively. We know that difference of their square is  $517 = 47 \cdot 11$ . And  $a^2 - b^2 = (a+b)(a-b)$ . Applying above formula we get  $(8x+13y)(2x+3y) = 47 \cdot 11$ . So only possible way is  $(8x+13y)=47$  and  $2x+3y=11$ . Solving we get  $x=1$  and  $y=3$ . Which gives 10th term as 123.

Question 8

Consider a sequence where the  $n^{\text{th}}$  term,  $t_n = n/(n+2), n = 1, 2, \dots$ . The value of  $t_3 * t_4 * t_5 * \dots * t_{53}$  equals.

CAT[2006]

- A 2/495
- B 2/477
- C 12/55

D 1/1485

Answer: A

Explanation:

substituting 3,4...53 in give function and multiplying the values  $\frac{3}{5} * \frac{4}{6} * \frac{5}{7} * \dots * \frac{52}{54} * \frac{53}{55}$  which may ultimately after cancellations give  $\frac{2}{495}$

Question 9

Consider the sequence of numbers  $a_1, a_2, a_3, \dots$  to infinity where  $a_1 = 81.33$  and  $a_2 = -19$  and  $a_j = a_{j-1} - a_{j-2}$  for  $j > 3$ . What is the sum of the first 6002 terms of this sequence?

CAT [2004]

A -100.33

B -30

C 62.33

D 119.33

Answer: C

Explanation:

According to given conditions the terms are 81.33, -19, -100.33, -81.33, 19, 100.33, 81.33, -19,.. Hence the series repeats after every 6 terms. Also summation of these 6 terms is 0. Hence summation of 6002 terms will be sum of first 2 terms which is 62.33.

## Enroll To MBA exams crash course

Question 10

What is the harmonic mean of the roots of the equation  $10x^2 + 4x - 3 = 0$ ?

A 3/2

B 2/3

C 4

D None of the above

Answer: A

Explanation:

Let the roots be a and b.

The product of roots =  $ab = -3/10$

The sum of roots =  $a+b = -4/10$

Harmonic mean =  $2ab/(a+b) = 2*(-3/10)/(-4/10) = 3/2$

Take NMAT Mocks here (Adaptive pattern)

Get 5 NMAT at just Rs. 499

Enroll To MBA exams crash course



**Take 3 Free CAT Mocks (With Solutions)**

**CAT previous papers (download pdf)**

**Free CAT Study Material**

**Take a free SNAP mock test**

**SNAP Previous Papers (Download PDF)**