**F.6 Mathematics**

**MC Exercise**

**6-1 Arithmetic Sequences**

**1.** It is given that the general term of a sequence is $T_n = 2n^2 - 3$. Find the first 3 terms of the sequence.

A. $-3, -1, 5$

B. $-3, -1, 1$

C. $-1, 1, 3$

D. $-1, 5, 15$

**2.** It is given that the general term of a sequence is $T_n = n \cdot 2^{n-1}$. Find the sum of the first 3 terms of the sequence.

A. 5

B. 17

C. 41

D. 68

**3.** Which of the following may represent the $n$th term of the sequence 6, 12, 20, 30, ⋯?

A. $(n+2)(n+3)$

B. $(n+1)(n+2)$

C. $n(n+1)$

D. $n(n-1)$

**4.** It is given that the general term of a sequence is $T_n = 7n + 11$. Find $T_{n+1} - T_n$.

A. 7

B. 9

C. 11

D. 18

**5.** In a sequence, the 1st term, the 2nd term and the 3rd term are $-1$, 3 and 1 respectively. For any positive integer $n$, the $(n+2)$th term is greater than the $n$th term by 2. Find the 6th term of the sequence.

A. 4

B. 5

C. 6

D. 7

**6.** In the figure, the 1st pattern consists of 3 dots. For any positive integer $n$, the $(n+1)$th pattern is formed by adding $(n+3)$ dots to the $n$th pattern. Find the number of dots in the 6th pattern.

A. 25

B. 28

C. 33

D. 48

**7.** It is given that the general term of a sequence is $T_n = 4n + 1$. If $G_n = \frac{T_{n+1} + T_n}{2}$, find $G_n$.

A. $4n + 3$

B. $4n + 5$

C. $8n + 6$

D. $8n + 8$

**8.** It is given that the general term of a sequence is $T_n = 2n^3$. Which of the following is a term of the sequence?

A. 4
B. 8
C. 16
D. 32

**9.** It is given that the general term of a sequence is $T_n = an + b$, where $a$ and $b$ are constants. If $T_3 = T_7 + 8$ and $T_2 + T_5 = 0$, find the values of $a$ and $b$.

A. $a = -2,\ b = 7$
B. $a = -4,\ b = 3$
C. $a = 2,\ b = -7$
D. $a = 4,\ b = 3$

**10.** It is given that the general term of a sequence is $T_n = an + 3$, where $a$ is a constant. If $T_6 = 15$, which of the following is a term of the sequence?

A. 1
B. 3
C. 9
D. 16

**11.** Which of the following is an arithmetic sequence/are arithmetic sequences?

I. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \cdots$

II. $3, 4, 6, 9, \cdots$

III. $2.1, 2.3, 2.5, 2.7, \cdots$

A. I only
B. III only
C. I and II only
D. II and III only

**12.** The $(n+1)$th term of the arithmetic sequence $12, 5, -2, -9, \cdots$ is

A. $20 - 7n$.
B. $19 - 7n$.
C. $12 - 7n$.
D. $7n - 2$.

**13.** Find the number of terms in the arithmetic sequence $1, 5, 9, 13, \cdots, 85$.

A. 21
B. 22
C. 23
D. 24

**14.** $n$ numbers are inserted between 23 and 69 such that these numbers form an arithmetic sequence. Find the common difference.

A. $\frac{69}{n-1}$
B. $\frac{69}{n+1}$
C. $\frac{46}{n+1}$
D. $\frac{46}{n+2}$

**15.** Given that $x, y, 5, \cdots$ and $y - 3, 4, x + 7, \cdots$ are arithmetic sequences, find the values of $x$ and $y$.

A. $x = 1,\ y = 3$
B. $x = 3,\ y = 4$
C. $x = 5,\ y = 5$
D. $x = 7,\ y = 6$

**16.** If $x$, $y$, $z$ form an arithmetic sequence, where $x+y+z=27$ and $xyz=693$, then the common difference of the sequence is

A. 2.
B. 3.
C. –2 or 2.
D. –3 or 3.

**17.** How many positive terms are there in the arithmetic sequence 52, 49, 46, 43, ⋯?

A. 12
B. 16
C. 17
D. 18

**18.** How many multiples of 7 are there between 200 and 650?

A. 61
B. 62
C. 63
D. 64

**19.** Find the number of positive integers which are less than 500 and **NOT** divisible by 12.

A. 441
B. 442
C. 458
D. 459

**20.** Seven numbers are inserted between $a$ and $b$ such that these nine numbers form an arithmetic sequence. Find the 3rd term of the sequence.

A. $\dfrac{3a+b}{4}$
B. $\dfrac{a+3b}{4}$
C. $\dfrac{7a+2b}{9}$
D. $\dfrac{2a+7b}{9}$

**21.** If $T_1, T_2, T_3, T_4, \cdots$ and $F_1, F_2, F_3, F_4, \cdots$ are two arithmetic sequences, which of the following must be (an) arithmetic sequence(s)?

I. $2T_1-F_1, 2T_2-F_2, 2T_3-F_3, 2T_4-F_4, \cdots$

II. $T_1+F_2, T_3+F_4, T_5+F_6, T_7+F_8, \cdots$

A. I only
B. II only
C. I and II
D. None of the above

**22.** It is given that 51, 59, 67, 75, ⋯, 123 is an arithmetic sequence. Find the value of $51+59+67+75+\cdots+123$.

A. 783
B. 870
C. 910
D. 975

**23.** If the general term of an arithmetic sequence is $T_n=5n-12$, find the sum of the first 15 terms.

A. 345
B. 420
C. 600
D. 840

**24.** If the sum of the first $n$ terms of an arithmetic sequence is $2n^2+7n$, find the 3rd term of the sequence.

A. 13
B. 15
C. 17
D. 39

**25.** The sum of the first 9 terms of an arithmetic sequence is 126 and that of the first 17 terms is 442. Find the common difference of the sequence.

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

**26.** The sum of the first 7 terms of an arithmetic sequence is $-112$ and that of the first 12 terms is $-342$. Find the general term $T_n$ of the sequence.

A. $4-5n$
B. $128-46n$
C. $-n-4$
D. $82n-128$

**27.** Find the sum of all multiples of 3 from 200 to 300 inclusive.

A. 8 217
B. 8 500
C. 8 517
D. 8 583

**28.** The $n$th term of a sequence is $23-4n$. Which of the following is/are true?

I. The first negative term of the sequence is $-1$.
II. The sequence has 5 positive terms.
III. The sum of the first $(3n+1)$ terms of the sequence is $-(3n+1)(6n-23)$.

A. I only
B. I and II only
C. II and III only
D. I, II and III

**29.** If the general term of an arithmetic sequence is $T_n=5+14n$, find $T_1+T_6+T_{11}+\cdots+T_{41}$.

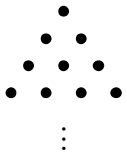
A. 2 392
B. 2 628
C. 2 691
D. 12 259

**30.** Let $a_n$ be the $n$th term of an arithmetic sequence. If $a_{11}=8$ and $a_{17}=-10$, which of the following are true?

I. $a_{14}<0$
II. $a_{10}+a_{16}>0$
III. $a_8+a_9+a_{10}+\cdots+a_{25}>0$

A. I and II only
B. I and III only
C. II and III only
D. I, II and III

**31.** The following triangular pattern is formed by dots. How many dots are required to form a pattern with 88 layers?



A. 3 916
B. 3 960
C. 7 832
D. 7 920

**32.** The following figures are formed by matches of equal length.


How many matches are needed to form the first 18 figures?

A. 333
B. 360
C. 513
D. 720

**33.** Karen piles up some \$2 coins in a way that there are 2 coins in the top layer, and each layer below has 1 more coin than the layer above it. If there are 18 layers in total, what is the total value of the coins?

A. \$189
B. \$324
C. \$342
D. \$378

**34.** In a theatre, there are 18 seats in the first row and each subsequent row has 3 more seats than the preceding one. If there are 414 seats in total, how many rows of seats are there in the theatre?

A. 12
B. 23
C. 24
D. 12 or 23

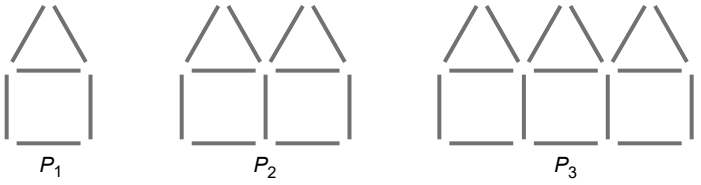
**35.** The exterior angles of a convex $n$-gon form an arithmetic sequence. If the common difference and the smallest exterior angle are 7° and 12° respectively, find the value of $n$.

A. 6
B. 8
C. 9
D. 12

**36.** The interior angles of a triangle form an arithmetic sequence. The range of the largest interior angle $\theta$ is

A. $45° \le \theta < 60°$.
B. $60° \le \theta < 90°$.
C. $60° \le \theta < 120°$.
D. $90° \le \theta < 180°$.

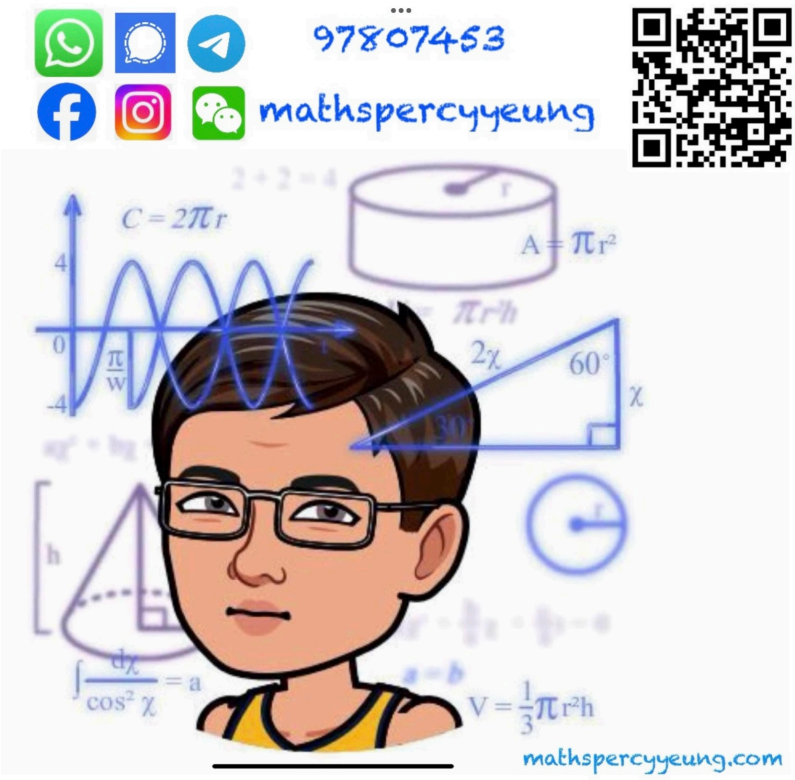
**37.** In the figure, a sequence of patterns are formed by sticks of equal length. Find the total number of sticks required to form the patterns from $P_{11}$ to $P_{17}$.




A. 476
B. 497
C. 515
D. 782

**38.** In a bag, there are altogether 18 red, yellow and white balls. The numbers of red, yellow and white balls form an arithmetic sequence and their product is 162. If most of the balls are white, find the number of white balls.

A. 3
B. 6
C. 9
D. 12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C = 2πr
A = πr²
V = 1/3 πr²h
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