ថ្នាក់ទី ១១

ស៊ីតចំនួនពិត

កម្រងលំហាត់

ដំណោះស្រាយ

ស្រាវជ្រាវដោយសិស្ស (11A,B)

ណែនាំដោយលោកគ្រូ ឃុយរាត្រី

2022 Reatrey Math

I.ស្វីតកើន

1. $a_n = 1-4n$
2. $a_n = -3n+4$
3. $a_n = -5n+11$
4. $a_n = -6n+11$
5. $a_n = -7n+5$
6. $a_n = -8n+5$
7. $a_n = -9n+1$
8. $a_n = -5n+3$
9. $a_n = -7n+3$
10. $a_n = -3n+4$
11. $a_n = -4n+1$
12. $a_n = -6n+7$
13. $a_n = -2n+12$
14. $a_n = -5n+2$
15. $a_n = -3n+2$
16. $a_n = -8n+6$
17. $a_n = -5n+6$
18. $a_n = -4n+1$
19. $a_n = -7n+1$
20. $a_n = -9n+3$

II.ស្វីតចុះ

1. $a_n = 3n+1$
2. $a_n = 6n+2$
3. $a_n = 12n+3$
4. $a_n = 24n+4$
5. $a_n = 48n+5$
6. $b_n = 96n+6$
7. $b_n = 192n+7$
8. $b_n = 384n+8$
9. $b_n = 768n+9$
10. $b_n = 1536n+10$
11. $b_n = 4n-1$
12. $b_n = 8n-2$
13. $b_n = 16n-3$
14. $b_n = 32n-4$
15. $b_n = 64n-5$
16. $a_n = \frac{5}{2}n+3$
17. $a_n = \frac{7}{2}n+5$
18. $a_n = n^2+2$
19. $a_n = \frac{n+1}{2}$
20. $a_n = 2n-3$
21. $a_n = 4n-3$
22. $a_n = \frac{2n}{n+1}$
23. $a_n = -\frac{1}{n}$
24. $a_n = \frac{2n+1}{n+3}$
25. $a_n = \frac{2n+1}{n+1}$
26. $a_n = 2n+3$
27. $a_n = \frac{n}{2n+1}$
28. $a_n = \frac{9}{2}n+5$
29. $a_n = 12+2n$
30. $a_n = \frac{3n}{2}$
31. $a_n = \frac{1}{2}n+4$
32. $a_n = \frac{5n-1}{3}$

III.ស្វីតទាល់លើ

1. $a_n = -4n+2$
2. $a_n = -2n+5$
3. $a_n = -7n+3$
4. $a_n = -4n+9$
5. $a_n = -10n+4$
6. $a_n = -2n+1$
7. $a_n = -3n+7$
8. $a_n = -\frac{1}{2}n+1$
9. $a_n = \frac{1}{n}$
10. $a_n = \frac{2}{n}$
11. $a_n = \frac{3}{n}$
12. $a_n = \frac{1}{n+1}$
13. $a_n = \frac{2}{n+2}$
14. $a_n = \frac{3}{2n+1}$
15. $a_n = \frac{1}{n+3}$
16. $a_n = -6n+1$
17. $a_n = \frac{8}{4n+1}$
18. $a_n = \frac{4}{7n}$
19. $a_n = \frac{4}{5n+3}$
20. $a_n = \frac{2}{n+2}$
21. $a_n = \frac{7}{4n}$
22. $a_n = \frac{5}{2n+1}$
23. $a_n = -10n+3$
24. $a_n = \frac{8}{n}$
25. $a_n = \frac{3}{5n}$
26. $a_n = \frac{3}{n}$
27. $a_n = \frac{3}{n+1}$

IV.ស្វីតទាល់ក្រោម

1. $a_n = 5^n + 12^n$
2. $a_n = 20n-10$
3. $b_n = 6n-8$
4. $a_n = 4n+2$
5. $c_n = 2^n + 3^n$
6. $a_n = \frac{9^n}{5^n}$
7. $b_n = 4n-12$
8. $a_n = 5^n - 7^n$
9. $a_n = 10n+2$
10. $a_n = \frac{3^n}{2^n}$

V.ស្វីតម៉ូណូតូន

1. $a_n = 2(-1)^n$
2. $a_n = \frac{n}{2^n}$
3. $a_n = n^2 - 3n + 2$
4. $a_n = 2n^2 - 1$
5. $a_n = 3n+2$
6. $a_n = \frac{3n^2+2n+1}{2n+2}$
7. $a_n = \left(\frac{3n^2+1}{2n-1}\right)^2$
8. $a_n = \frac{\sqrt{3n}+2}{2}$
9. $a_n = \left(\frac{\sqrt{3n}-2}{2}\right)^2$

10. $a_n = \dfrac{4n^2+2n}{5}$ 11. $a_n = \dfrac{3n^2+2n}{7}$ 12. $a_n = 4n^4 - 8n - 1$

13. $a_n = 5n^4 - 2n^3 - n^2 + n$ 14. $a_n = \dfrac{6n^2 - 2n^2 + n}{2n}$ 15. $a_n = 2(-1)^n + n - 2n$

16. $a_n = 2(-2)^n - 3n^2 + n$ 17. $a_n = \dfrac{2(-1)^n - 2n^2 - n}{3n}$ 18. $a_n = \left(\dfrac{9n^3+3n^2+3}{3}\right)^2$

19. $a_n = \sqrt{\dfrac{n^4+2n^2-1}{2}}$ 20. $a_n = \left(\dfrac{3n^2+2n-n}{2}\right)^3$

VI.ស៊ីតនព្ធន្ត

ក, គណនាតួទីn

1. (a_n) 5,12,19... 2. (a_n) 100,95,90,... 3.$(a_n) = -8,-3,2,7,...$

4.$(a_n) = 2,4,6,...$ 5.$(a_n) - 9,-4,1,...$ 6.(a_n)4,15,26,...

7.(a_n)5,1,–3,– 7,–11,... 8.$(a_n) - 2,-9,-16,...$ 9.(a_n)7,12,17,...

10.(a_n)8,13,18,... 11.(a_n)1,3,5,... 12.$(a_n)\dfrac{1}{2},\dfrac{7}{2},\dfrac{13}{2},\dfrac{19}{2}$

13.(a_n)5,10,15,... 14.(a_n)8,17,26,... 15.(a_n)1,13,25,...

16.(a_n)115,100,85,... 17.$(a_n) - 10,-5,0,5,...$ 18.$(a_n)\dfrac{9}{2},6,\dfrac{15}{2},9,...$

19.$(a_n)3\sqrt{3},6\sqrt{3},9\sqrt{3},...$ 20. $(a_n)\sqrt{3},2\sqrt{3},3\sqrt{3}$ 21.$(a_n)\sqrt{2},6\sqrt{2},11\sqrt{2},16\sqrt{2}$

ខ,ស្វែតនព្ធន្តកម្រិតខ្ពស់

1, **គេមានស៊ីតនព្ធន្ត** 4, 7, 10, 13, …, 31

ក, គណនាតួទី n

ខ, គណនាចំនួនតួនៃស៊ីត

2, **គេមានស៊ីតនព្ធន្ត** 1, 7, 13, 19, …

ក, រកតួទី n

ខ, គណនាតម្លៃនៃតួទី10

គ, គណនាចំនួនតួនៃតម្លៃ115

3, **គេមានស៊ីតនព្ធន្តដោយដឹងថា** $a_{35} = 9$, $a_{45} = 17$

ក, រកតួទីn

ខ, គណនាតម្លៃនៃតួទី40**ដំបូង**

4, **គេមាន** (a_n) 2, 4, 6, …

ក, គណនាតួទី20

ខ, តើចំនួន236**ជាតួទីប៉ុន្មាន** ?

5, (a_n) -9, -4, 1, …

ក, រកតួទីn

ខ, គណនាតួទី50ដំបូង

គ, តើចំនួន171ជាតួទីប៉ុន្មាន?

6, គេមាន (a_n) ជាស្ទីតនព្វន្ត

ក, រកតួទីn

ខ, គណនាតួទី40

7, គេមានស្ទីតនព្វន្ត

ក, គណនាតួទីn និង 20តួដំបូង

ខ, គណនាផល20បូកតួដំបូង

8, គេមានស្ទីតនព្វន្ត $a_{20}=61, a_{30}=91$

ក, គណនា (a_n) និងតួទី40

ខ, គណនាផលបូក40តួដំបូង

9, គណនាផលបូកស្ទីតខាងក្រោម

ក, 1+4+7+10+…+58

ខ, 115+110+105+…+65

10, 1, គេមាន $s=1+13+25+...$

ក, គណនាតួទី20

ខ,គណនាផលបូក20តួដំបូង

11, គេមានស្ទីតនព្វន្ត

$a_5=20, s_2=12$

រក $d, a_1, a_n, a_{10}, s_{10}$

12, គេមានស្ទីតនព្វន្ត $a_4=7, s_2=4$

រក d, a_1, a_n, a_8, s_8

13, គេមានស្ទីតនព្វន្ត $s_2=12, s_5=45$

រក a_n, s_n, s_n, s_{20}

VII.ស្ទីតធរណីមាត្រ

1. $5, 30, 180, 1080, ...$

2. $-2, -8, -32, -128,$

3. $\frac{1}{4}, -\frac{1}{12}, \frac{1}{36}, -\frac{1}{108}$

4, គេឲស្ទីតធរណីមាត្រ $3, 9, 27, 81, ...$

ក, គណនាតួទី7

ខ, តើចំនួន13122ជាតួទីប៉ុន្មាននៃស្ទីត?

5. គេអោយស្ទីតធរណីមាត្រ $6, 24, 96, 384$

ក, គណនា u_{11}

ខ, តើចំនួន6144ជាតួទីប៉ុន្មាន?

6, $20, 10, 5, \frac{5}{2}, ... \frac{5}{256}$

7, $\sqrt{2}, 2, 2\sqrt{2}, 4, ..., 1024$

8, បើ $u_1=3 \& q=5$

9, **បើ** $u_9 = 256 \& q = -3$

10, **បើ** $u_6 = 8 \& u_{15} = 4096$

11, **បើ** $a_o = 5, q = 5$

12, **បើ** $a_4 = 3, q = \frac{1}{2}$

13, **គេមានស្ទីតធរណីមាត្រ** $(a_n): 2,6,18,54,...$

ក, **គណនាតួទី**8

ខ, **តើចំនួន**13122**ជាតួទីប៉ុន្មាន**?

14, **គេមានស្ទីតធរណីមាត្រ** $(a_n): 3,12,48,...$

ក, **គណនា** $a_n \& a_{10}$

ខ, **រកចំនួនតួ**12288

15, **គេមានស្ទីតធរណីមាត្រ** $(a_n): 1,2,4,8,...$

ក, **គណនា** a_n, a_5, a_3

ខ, **តើចំនួន**2048**ជាតួទីប៉ុន្មាន**?

16, **គេមានស្ទីតធរណីមាត្រ** $(a_n): 20,10,...$

ក, **គណនា** a_n, a_3, a_4

ខ, **តើចំនួន** $\frac{5}{256}$ **ជាតួទីប៉ុន្មាន**?

17, **គណនាផលបូក** $2+6+18+...+1458$

18, **គណនាផលបូក** $24+12+6+...+\frac{3}{8}$

19, $a_3 = 10, a_6 = 640$

រក $q, a_1, a_n, a_{20}, s_{20}$

20, $s_n = 1+11+111+...+111...111$

21, $s_n = 5+55+555+...+555...555$

22, $s_n = \frac{1}{3}+(\frac{1}{3})^2+(\frac{1}{3})^3+...+(\frac{1}{3})^n$

23, **គណនាផលបូក អនន្តតួរ**

$$s = 6+2+\frac{2}{3}+\frac{2}{9}+...$$

24, $a_1 = 3, s_3 = 21,$

រក q, a_n, a_7, s_7

VIII.ផលបូកស្ទីត

1. $s = 1+2+3+...+20$

2, $s = 1^2+2^2+3^2+...+30^2$

3, $s = 11+12+13+...+20$

4. $s_n = \frac{1}{1\times 5}+\frac{1}{5\times 9}+\frac{1}{9\times 13}+...+\frac{1}{(4n-3)(4n+1)}$

$5, s_n = 1\cdot 3 + 2\cdot 9 + 3\cdot 27 + \ldots + n\cdot 3^n$	$8, (a_n): 3,4,7,12,19,\ldots$
$6, s_n = 3\cdot 3 + 4\cdot 9 + 5\cdot 27 + \ldots + (n+2)3^n$	$9, a_1 = 7, a_{n+1} = 2a_1 + 3$
$7, (a_n): 3,5,9,15,23,\ldots$	$10, a_1 = 2, a_n = 3a_1 - 2$

I.ស្ទីតកើន

1. $a_n = 3n+1$

$\Rightarrow a_{n+1} = 3(n+1)+1$

$=3n+3+1$

$=3n+4$

$\Rightarrow a_{n+1} - a_n = 3n+4-(3n+1)$

$=3n+4-3n+1$

$=3>0$

ដូចនេះ(a_n)**ជាស្ទីតកើន**

2. $a_n = 6n+2$

$\Rightarrow a_{n+1} = 6(n+1)+2$

$=6n+6+2$

$=6n+8$

$\Rightarrow a_{n+1} - a_n = 6n+8-(6n+2)$

$=6n+8-6n+2$

$=6>0$

ដូចនេះ(a_n)**ជាស្ទីតកើន**

3. $a_n = 12n+3$

$\Rightarrow a_{n+1} = 12(n+1)+3$

$=12n+12+3$

$=12n+15$

$\Rightarrow a_{n+1} - a_n = 12n+15-(12n+3)$

$=12n+15-12n+3$

$=12>0$

ដូចនេះ(a_n)**ជាស្ទីតកើន**

4. $a_n = 24n+4$

$\Rightarrow a_{n+1} = 24(n+1)+4$

$=24n+24+4$

$=24n+28$

$\Rightarrow a_{n+1} - a_n = 24n+28-(24n+4)$

$=24n+28-24n+4$

$=24>o$

ដូចនេះ(a_n)**ជាស្ទីតកើន**

5. $a_n = 48n+5$

$\Rightarrow a_{n+1} = 48(n+1)+5$

$=48n+48+5$

$=48n+53$

$\Rightarrow a_{n+1} - a_n = 48n+53-(48n+5)$

$=48n+53-48n-5$

$=48>0$

ដូចនេះ(a_n)**ជាស្ទីតកើន**

6. $b_n = 96n+6$

$\Rightarrow b_{n+1} = 96(n+1)+6$

$=96n+96+6$

$=96n+102$

$\Rightarrow b_{n+1} - b_n = 96n+102-(96n+6)$

$=96n+102-96n-6$

$=96>0$

ដូចនេះ(b_n)**ជាស្ទីតកើន**

7. $b_n = 192n+7$

$\Rightarrow b_{n+1} = 192(n+1)+7$

$=192n+192+7$

$=192n+199$

$\Rightarrow b_{n+1} - b_n = 192n+199-(192n+7)$

$=192n+199-192n-7$

$=192>0$

ដូចនេះ(b_n)**ជាស្ទីតកើន**

8. $b_n = 384n + 8$

$\Rightarrow b_{n+1} = 384(n+1) + 8$

$= 384n + 384 + 8$

$= 384n + 392$

$\Rightarrow b_{n+1} - b_n = 384n + 392 - (384n + 8)$

$= 384n + 392 - 384n - 8$

$= 384 > 0$

ដូចនេះ (b_n) **ជាស្ទីតកើន**

9. $b_n = 768n + 9$

$\Rightarrow b_{n+1} = 768(n+1) + 9$

$= 768n + 768 + 9$

$= 768n + 777$

$\Rightarrow b_{n+1} - b_n = 768n + 777 - (768n + 9)$

$= 768n + 777 - 768n - 9$

$= 768 > 0$

ដូចនេះ (b_n) **ជាស្ទីតកើន**

10. $b_n = 1536n + 10$

$\Rightarrow b_{n+1} = 1536(n+1) + 10$

$= 1536n + 1536 + 10$

$= 1536n + 1546$

$\Rightarrow b_{n+1} - b_n = 1536n + 1546 - (1536n + 10)$

$= 1536n + 1546 - 1536n - 10$

$\equiv 1536 > 0$

ដូចនេះ (b_n) **ជាស្ទីតកើន**

11. $b_n = 4n - 1$

$\Rightarrow b_{n+1} = 4(n+1) - 1$

$= 4n + 4 - 1$

$= 4n + 3$

$\Rightarrow b_{n+1} - b_n = 4n + 3 - (4n - 1)$

$= 4n + 3 - 4n + 1$

$= 4 > 0$

ដូចនេះ (b_n) **ជាស្ទីតកើន**

12. $b_n = 8n - 2$

$\Rightarrow b_{n+1} = 8(n+1) - 2$

$= 8n + 8 - 2$

$= 8n + 6$

$\Rightarrow b_{n+1} - b_n = 8n + 6 - (8n - 2)$

$= 8n + 6 - 8n + 2$

$= 8 > 0$

ដូចនេះ (b_n) **ជាស្ទីតកើន**

13. $b_n = 16n - 3$

$\Rightarrow b_{n+1} = 16(n+1) - 3$

$= 16n + 16 - 3$

$= 16n + 13$

$\Rightarrow b_{n+1} - b_n = 16n + 13 - (16n - 3)$

$= 16n + 13 - 16n + 3$

$= 16 > 0$

ដូចនេះ (b_n) **ជាស្ទីតកើន**

14. $b_n = 32n - 4$

$\Rightarrow b_{n+1} = 32(n+1) - 4$

$= 32n + 32 - 4$

$= 32n + 28$

$\Rightarrow b_{n+1} - b_n = 32n + 28 - (32n - 4)$

$= 32n + 28 - 32n + 4$

$= 32 > 0$

ដូចនេះ (b_n) **ជាស្ទីតកើន**

15. $b_n = 64n - 5$

$\Rightarrow b_{n+1} = 64(n+1) - 5$

$= 64n + 64 - 5$

$= 64n + 59$

$\Rightarrow b_{n+1} - b_n = 64n + 59 - (64n - 5)$

$= 64n + 59 - 64n + 5$

$= 64 > 0$

ដូចនេះ (b_n) **ជាស្ទីរកើន**

16. $a_n = \frac{5}{2}n + 3$

$\Rightarrow a_{n+1} = \frac{5}{2}(n+1) + 3$

$= \frac{5}{2}n + \frac{5}{2} + 3$

$= \frac{5}{2}n + \frac{11}{2}$

$\Rightarrow a_{n+1} - a_n = \frac{5}{2}n + \frac{11}{2} - (\frac{5}{2} + 3)$

$= \frac{5}{2}n + \frac{11}{2} - \frac{5}{2} - 3$

$= \frac{5}{2} > 0$

ដូចនេះ(a_n)**ជាស្ទីតកើន**

17. $a_n = \frac{7}{2}n + 5$

$\Rightarrow a_{n+1} = \frac{7}{2}(n+1) + 5$

$= \frac{7}{2}n + \frac{7}{2} + 5$

$= \frac{7}{2}n + \frac{17}{2}$

$\Rightarrow a_{n+1} - a_n = \frac{7}{2}n + \frac{17}{2} - (\frac{7}{2}n + 5)$

$= \frac{7}{2}n + \frac{17}{2} - \frac{7}{2}n - 5$

$= \frac{7}{2} > 0$

ដូចនេះ(a_n)**ជាស្ទីតកើន**

18. $a_n = n^2 + 2$

$\Rightarrow a_{n+1} = (n+1)^2 + 2$

$= n^2 + 2n + 1 + 2$

$= n^2 + 2n + 3$

$\Rightarrow a_{n+1} - a_n = n^2 + 2n + 3 - (n^2 + 2)$

$= n^2 + 2n + 3 - n^2 + 2$

$= 2n + 1 > 0$

ដូចនេះ(a_n)**ជាស្ទីតកើន**

19. $a_n = \frac{n+1}{2}$

$\Rightarrow a_{n+1} = \frac{(n+1)+1}{2}$

$= \frac{n+2}{2}$

$\Rightarrow a_{n+1} - a_n = \frac{n+2}{2} - \frac{n+1}{2}$

$= \frac{n+2-n-1}{2}$

$= \frac{1}{2} > 0$

ដូចនេះ(a_n)**ជាស្ទីតកើន**

20. $a_n = 2n - 3$

$\Rightarrow a_{n+1} = 2(n+1) - 3$

$= 2n + 2 - 3$

$= 2n - 1$

$\Rightarrow a_{n+1} - a_n = 2n - 1 - (2n - 3)$

$= 2n - 1 - 2n + 3$

$= 2 > 0$

ដូចនេះ(a_n)**ជាស្ទីតកើន**

21. $a_n = 4n - 3$

$\Rightarrow a_{n+1} = 4(n+1) - 3$

$= 4n + 4 - 3$

$= 4n + 1$

$\Rightarrow a_{n+1} - a_n = 4n + 1 - (4n - 3)$

$= 4n + 1 - 4n + 3$

$= 4 > 0$

ដូចនេះ(a_n)**ជាស្ទីតកើន**

22. $a_n = \frac{2n}{n+1}$

$\Rightarrow a_{n+1} = \frac{2(n+1)}{(n+1)+1}$

$= \frac{2n+2}{n+1+1}$

$$= \frac{2n+2}{n+2}$$

$$\Rightarrow a_{n+1} - a_n = \frac{2n+2}{n+2} - \frac{2n}{n+1}$$
$$= \frac{(2n+2)(n+1) - 2n(n+2)}{(n+2)(n+1)}$$
$$= \frac{2n^2+2n+2n+2-2n^2-4n}{(n+2)(n+1)}$$
$$= \frac{2}{(n+2)(n+1)} > 0$$

ដូចនេះ (a_n) **ជាស្ទីតកើន**

$$23.\ a_n = -\frac{1}{n}$$
$$\Rightarrow a_{n+1} = -\frac{1}{n+1}$$
$$\Rightarrow a_{n+1} - a_n = -\frac{1}{n+1} - (-\frac{1}{n})$$
$$= -\frac{1}{n+1} + \frac{1}{n}$$
$$= \frac{-n+(n+1)}{n(n+1)}$$
$$= \frac{-n+n+1}{n(n+1)}$$
$$= \frac{1}{n(n+1)} > 0$$

ដូចនេះ (a_n) **ជាស្ទីតកើន**

$$24.\ a_n = \frac{2n+1}{n+3}$$
$$\Rightarrow a_{n+1} = \frac{2(n+1)+1}{(n+1)+3}$$
$$= \frac{2n+3}{n+4}$$
$$\Rightarrow a_{n+1} - a_n = \frac{2n+3}{n+4} - \frac{2n+1}{n+3}$$
$$= \frac{(2n+3)(n+3) - (2n+1)(n+4)}{(n+4)(n+3)}$$
$$= \frac{2n^2+6n+3n+9-(2n^2+8n+n+4)}{(n+4)(n+3)}$$
$$= \frac{2n^2+9n+9-2n^2-9n-4}{(n+4)(n+3)}$$
$$= \frac{5}{(n+4)(n+3)} > 0$$

ដូចនេះ (a_n) **ជាស្ទីតកើន**

$$25.\ a_n = \frac{2n+1}{n+1}$$
$$\Rightarrow a_{n+1} = \frac{2(n+1)+1}{(n+1)+1}$$
$$= \frac{2n+2+1}{n+1+1}$$
$$= \frac{2n+3}{n+2}$$
$$\Rightarrow a_{n+1} - a_n = \frac{2n+3}{n+2} - \frac{2n+1}{n+1}$$
$$= \frac{(2n+3)(n+1) - (2n+1)(n+2)}{(n+1)(n+2)}$$
$$= \frac{2n^2+2n+3n+3-(2n^2+4n+n+2)}{(n+1)(n+2)}$$
$$= \frac{2n^2+2n+3n+2-2n^2-4n-n-2}{(n+1)(n+2)}$$
$$= \frac{1}{(n+1)(n+2)} > 0$$

ដូចនេះ (a_n) **ជាស្ទីតកើន**

$$26.\ a_n = 2n+3$$
$$\Rightarrow a_{n+1} = 2(n+1)+3$$
$$= 2n+2+3$$
$$= 2n+5$$
$$\Rightarrow a_{n+1} - a_n = 2n+5-(2n+3)$$
$$= 2n+5-2n-3$$
$$= 2 > 0$$

ដូចនេះ (a_n) **ជាស្ទីតកើន**

$$27.\ a_n = \frac{n}{2n+1}$$
$$\Rightarrow a_{n+1} = \frac{n+1}{2(n+1)+1}$$
$$= \frac{n+1}{2n+2+1}$$
$$= \frac{n+1}{2n+3}$$

$$\Rightarrow a_{n+1}-a_n=\frac{n+1}{2n+3}-\frac{n}{2n+1}$$
$$=\frac{(n+1)(2n+1)-n(2n+3)}{(2n+1)(2n+3)}$$
$$=\frac{3n^2+n+2n+1-3n^2-3n}{(2n+1)(2n+3)}$$
$$=\frac{1}{(2n+1)(2n+3)}>0$$

ដូចនេះ(a_n)**ជាស្ទីតកើន**

28. $a_n=\frac{9}{2}n+5$

$$\Rightarrow a_{n+1}=\frac{9}{2}(n+1)+5$$
$$=\frac{9}{2}n+\frac{9}{2}+5$$
$$=\frac{9}{2}n+\frac{19}{2}$$
$$\Rightarrow a_{n+1}-a_n=\frac{9}{2}n+\frac{19}{2}-(\frac{9}{2}n+5)$$
$$=\frac{9}{2}n+\frac{19}{2}-\frac{9}{2}n-5$$
$$=\frac{19}{2}-\frac{10}{2}$$
$$=\frac{9}{2}>0$$

ដូចនេះ(a_n)**ជាស្ទីតកើន**

29. $a_n=12+2n$

$$\Rightarrow a_{n+1}=12+2(n+1)$$
$$=12+2n+2$$
$$=2n+14$$
$$\Rightarrow a_{n+1}-a_n=2n+14-(12+2n)$$
$$=2n+14-12-2n$$
$$=2>0$$

ដូចនេះ(a_n)**ជាស្ទីតកើន**

30. $a_n=\frac{3n}{2}$

$$\Rightarrow a_{n+1}=\frac{3(n+1)}{2}$$
$$=\frac{3n+3}{2}$$
$$\Rightarrow \alpha_{n+1}-a_n=\frac{3n+3}{2}-\frac{3n}{2}$$
$$=\frac{3n+3-3n}{2}$$
$$=\frac{3}{2}>0$$

ដូចនេះ(a_n)**ជាស្ទីតកើន**

31. $a_n=\frac{1}{2}n+4$

$$\Rightarrow a_{n+1}=\frac{1}{2}(n+1)+4$$
$$=\frac{1}{2}n+\frac{1}{2}+4$$
$$=\frac{1}{2}n+\frac{9}{2}$$
$$\Rightarrow a_{n+1}-a_n=\frac{1}{2}n+\frac{9}{2}-(\frac{1}{2}n+4)$$
$$=\frac{1}{2}n+\frac{9}{2}-\frac{1}{2}n-4$$
$$=\frac{1}{2}>0$$

ដូចនេះ(a_n)**ជាស្ទីតកើន**

32. $a_n=\frac{5n-1}{3}$

$$\Rightarrow a_{n+1}=\frac{5(n+1)-1}{3}$$
$$=\frac{5n+5-1}{3}$$
$$=\frac{5n+4}{3}$$
$$\Rightarrow a_{n+1}-a_n=\frac{5n+4}{3}-\frac{5n-1}{3}$$
$$=\frac{5n+4-5n+1}{3}$$
$$=\frac{5}{3}>0$$

ដូចនេះ(a_n)**ជាស្ទីតកើន**

II.ស្ទីតចុះ

1. $a_n = 1-4n$

$\Rightarrow a_{n+1} = -4(n+1)+1$
$= -4n-4+1$
$= -4n-3$

$\Rightarrow a_{n+1}-a_n = -4n-3-(1-4n)$
$= -4n-3-(1-4n)$
$= -4 < 0$

ដូចនេះ(a_n)**ជាស្ទីតចុះ**

2. $a_n = -3n+4$

$\Rightarrow a_{n+1} = -3(n+1)+4$
$= -3n-3+4$
$= -3n+1$

$\Rightarrow a_{n+1}-a_n = -3n+1-(-3n+4)$
$= -3n+1+3n-4$
$= -3 < 0$

ដូចនេះ(a_n)**ជាស្ទីតចុះ**

3. $a_n = -5n+11$

$\Rightarrow a_{n+1} = -5(n+1)+11$
$= -5n-5+11$
$= -5n+6$

$\Rightarrow a_{n+1}-a_n = -5n+6-(-5n+11)$
$= -5n+6+5n-11$
$= -5 < 0$

ដូចនេះ(a_n)**ជាស្ទីតចុះ**

4. $a_n = -6n+11$

$\Rightarrow a_{n+1} = -6(n+1)+11$
$= -6n-6+11$
$= -6n+5$

$\Rightarrow a_{n+1}-a_n = -6n+5-(-6n+11)$
$= -6n+5+6n-11$
$= -6 < 0$

ដូចនេះ(a_n)**ជាស្ទីតចុះ**

5. $a_n = -7n+5$

$\Rightarrow a_{n+1} = -7(n+1)+5$
$= -7n-7+5$
$= -7n-2$

$\Rightarrow a_{n+1}-a_n = -7n-2-(-7n+5)$
$= -7n-2+7n-5$
$= -7 < 0$

ដូចនេះ(a_n)**ជាស្ទីតចុះ**

6. $a_n = -8n+5$

$\Rightarrow a_{n+1} = -8(n+1)+5$
$= -8n-8+5$
$= -8n-3$

$\Rightarrow a_{n+1}-a_n = -8n-3-(-8n+5)$
$= -8n-3+8n-5$
$= -8 < 0$

ដូចនេះ(a_n)**ជាស្ទីតចុះ**

7. $a_n = -9n+1$

$\Rightarrow a_{n+1} = -9(n+1)+1$
$= -9n-9+1$
$= -9n-8$

$\Rightarrow a_{n+1}-a_n = -9n-8-(-9n+1)$
$= -9n-8+9n-1$
$= -9 < 0$

ដូចនេះ(a_n)**ជាស្ទីតចុះ**

8. $a_n = -5n+3$

$\Rightarrow a_{n+1} = -5(n+1)+3$
$= -5n-5+3$
$= -5n-2$

$\Rightarrow a_{n+1}-a_n=-5n-2-(-5n+3)$
$=-5n-2+5n-3$
$=-5<0$

ដូចនេះ(a_n)**ជាស្ទីតចុះ**

9. $a_n=-7n+3$
$\Rightarrow a_{n+1}=-7(n+1)+3$
$=-7n-7+3$
$=-7n-4$
$\Rightarrow a_{n+1}-a_n=-7n-4-(-7n+3)$
$=-7n-4+7n-3$
$=-7<0$

ដូចនេះ(a_n)**ជាស្ទីតចុះ**

10. $a_n=-3n+4$
$\Rightarrow a_{n+1}=-3(n+1)+4$
$=-3n-3+4$
$=-3n+1$
$\Rightarrow a_{n+1}-a_n=-3n+1-(-3n+4)$
$=-3n+1+3n-4$
$=-3<0$

ដូចនេះ(a_n)**ជាស្ទីតចុះ**

11. $a_n=-4n+1$
$\Rightarrow a_{n+1}=-4(n+1)+1$
$=-4n-4+1$
$=-4n-3$
$\Rightarrow a_{n+1}-a_n=-4n-3-(-4n+1)$
$=-4n-3+4n-1$
$=-4<0$

ដូចនេះ(a_n)**ជាស្ទីតចុះ**

12. $a_n=-6n+7$
$\Rightarrow a_{n+1}=-6(n+1)+7$
$=-6n-6+7$
$=-6n+1$
$\Rightarrow a_{n+1}-a_n=-6n+1-(-6n+7)$
$=-6n+1+6n-7$
$=-6<0$

ដូចនេះ(a_n)**ជាស្ទីតចុះ**

13. $a_n=-2n+12$
$\Rightarrow a_{n+1}=-2(n+1)+12$
$=-2n-2+12$
$=-2n+10$
$\Rightarrow a_{n+1}-a_n=-2n+10-(-2n+12)$
$=-2n+10+2n-12$
$=-2<0$

ដូចនេះ(a_n)**ជាស្ទីតចុះ**

14. $a_n=-5n+2$
$\Rightarrow a_{n+1}=-5(n+1)+2$
$=-5n-5+2$
$=-5n-3$
$\Rightarrow a_{n+1}-a_n=-5n-3-(-5n+2)$
$=-5n-3+5n-2$
$=-5<0$

ដូចនេះ(a_n)**ជាស្ទីតចុះ**

15. $a_n=-3n+2$
$\Rightarrow a_{n+1}=-3(n+1)+2$
$=-3n-3+2$
$=-3n-1$
$\Rightarrow a_{n+1}-a_n=-3n-1-(-3n+2)$
$=-3n-1+3n-2$
$=-3<0$

ដូចនេះ(a_n)**ជាស្ទីតចុះ**

16. $a_n=-8n+6$
$\Rightarrow a_{n+1}=-8(n+1)+6$
$=-8n-8+6$
$=-8n-2$

$$\Rightarrow a_{n+1}-a_n=-8n-2-(-8n+6)$$
$$=-8n-2+8n-6$$
$$=-8<0$$

ដូចនេះ(a_n)**ជាស្ទីតចុះ**

17. $a_n=-5n+6$
$$\Rightarrow a_{n+1}=-5(n+1)+6$$
$$=-5n-5+6$$
$$=-5n+1$$
$$\Rightarrow a_{n+1}-a_n=-5n+1-(-5n+6)$$
$$=-5n+1+5n-6$$
$$=-5<0$$

ដូចនេះ(a_n)**ជាស្ទីតចុះ**

18. $a_n=-4n+1$
$$\Rightarrow a_{n+1}=-4(n+1)+1$$
$$=-4n-4+1$$
$$=-4n-3$$
$$\Rightarrow a_{n+1}-a_n=-4n-3-(-4n+1)$$
$$=-4n-3+4n-1$$
$$=-4<0$$

ដូចនេះ(a_n)**ជាស្ទីតចុះ**

19. $a_n=-7n+1$
$$\Rightarrow a_{n+1}=-7(n+1)+1$$
$$=-7n-7+1$$
$$=-7n-6$$
$$\Rightarrow a_{n+1}-a_n=-7n-6-(-7n+1)$$
$$=-7n-6+7n-1$$
$$=-7<0$$

ដូចនេះ(a_n)**ជាស្ទីតចុះ**

20. $a_n=-9n+3$
$$\Rightarrow a_{n+1}=-9(n+1)+3$$
$$=-9n-9+3$$
$$=-9n-6$$
$$\Rightarrow a_{n+1}-a_n=-9n-6-(-9n+3)$$
$$=-9n-6+9n-3$$
$$=-9<0$$

ដូចនេះ(a_n)**ជាស្ទីតចុះ**

III.ស្ទីតទាល់លើ

1. $a_n=-4n+2$
$$\forall n\in\mathbb{N},n\geq 1$$
$$4n\leq -4$$
$$-4n+2\leq -4+2$$
$$a_n\leq -2$$

ដូចនេះ(a_n)**ជាស្ទីតទាល់លើ មានគោលលើ**

$M=-2$

2. $a_n=-2n+5$
$$\forall n\in\mathbb{N},n\geq 1$$
$$-2n\leq -2$$
$$-2n+5\leq -2+5$$
$$a_n\leq 3$$

ដូចនេះ(a_n)**ជាស្ទីតទាល់លើ មានគោលលើ**

$M=3$

3. $a_n=-7n+3$
$$\forall n\in\mathbb{N},n\geq 1$$
$$-7n\leq -7$$
$$-7n+3\leq -7+3$$
$$a_n\leq -4$$

ដូចនេះ(a_n)**ជាស្ទីតទាល់លើ មានគោលលើ**

$M=-4$

4. $a_n=-4n+9$
$$\forall n\in\mathbb{N},n\geq 1$$
$$-4n\leq -4$$
$$-4n+9\leq -4+9$$
$$a_n\leq 5$$

ដូចនេះ(a_n)**ជាស្ទីតទាល់លើ មានគោលលើ**

$M=5$

5. $a_n=-10n+4$

$\forall n\in\mathbb{N}, n\geq 1$

$-10n\leq -10$

$-10n+4\leq -10+4$

$a_n\leq -6$

ដូចនេះ(a_n)**ជាស្ទីតទាល់លើ មានគោលលើ**

$M=-6$

6. $a_n=-2n+1$

$\forall n\in\mathbb{N}, n\geq 1$

$-2n\leq -2$

$-2n+1\leq -2+1$

$a_n\leq -1$

ដូចនេះ(a_n)**ជាស្ទីតទាល់លើ មានគោលលើ**

$M=-1$

7. $a_n=-3n+7$

$\forall n\in\mathbb{N}, n\geq 1$

$-3n\leq -3$

$-3n+7\leq -3+7$

$a_n\leq 4$

ដូចនេះ(a_n)**ជាស្ទីតទាល់លើ មានគោលលើ**

$M=4$

8. $a_n=-\frac{1}{2}n+1$

$\forall n\in\mathbb{N}, n\geq 1$

$-\frac{1}{2}n\leq -\frac{1}{2}$

$-\frac{1}{2}n+1\leq -\frac{1}{2}+1$

$a_n\leq \frac{1}{2}$

ដូចនេះ(a_n)**ជាស្ទីតទាល់លើ មានគោលលើ**

$M=\frac{1}{2}$

9. $a_n=\frac{1}{n}$

$\forall n\in\mathbb{N}, n\geq 1$

$\frac{n}{n}\leq \frac{1}{n}$

$1\geq \frac{1}{n}\Leftrightarrow \frac{1}{n}\leq 1$

$a_n\leq 1$

ដូចនេះ(a_n)**ជាស្ទីតទាល់លើ មានគោលលើ**

$M=1$

10. $a_n=\frac{2}{n}$

$\forall n\in\mathbb{N}, n\geq 1$

$\frac{n}{n}\geq \frac{1}{n}$

$1\geq \frac{1}{n}$

$2\geq \frac{2}{n}\Leftrightarrow \frac{2}{n}\leq 2$

$a_n\leq 2$

ដូចនេះ(a_n)**ជាស្ទីតទាល់លើ មានគោលលើ**

$M=2$

11. $a_n=\frac{3}{n}$

$\forall n\in\mathbb{N}, n\geq 1$

$\frac{n}{n}\geq \frac{1}{n}$

$1\geq \frac{1}{n}$

$3\geq \frac{3}{n}\Leftrightarrow \frac{3}{n}\leq 3$

$a_n\leq 3$

ដូចនេះ(a_n)**ជាស្ទីតទាល់លើ មានគោលលើ**

$M=3$

12. $a_n = \dfrac{1}{n+1}$

$\forall n \in \mathbb{N}, n \geq 1$

$n+1 \geq 1+1$

$n+1 \geq 2$

$\dfrac{1}{n+1} \leq \dfrac{1}{2}$

$a_n \leq \dfrac{1}{2}$

ដូចនេះ (a_n) **ជាស្ទីតទាល់លើ មានគោលលើ**

$M = \dfrac{1}{2}$

13. $a_n = \dfrac{2}{n+2}$

$\forall n \in \mathbb{N}, n \geq 1$

$n+2 \geq 1+1$

$n+2 \geq 3$

$\dfrac{1}{n+2} \leq \dfrac{1}{3}$

$\dfrac{2}{n+2} \leq \dfrac{2}{3}$

$a_n \leq \dfrac{2}{3}$

ដូចនេះ (a_n) **ជាស្ទីតទាល់លើ មានគោលលើ**

$M = \dfrac{2}{3}$

14. $a_n = \dfrac{3}{2n+1}$

$\forall n \in \mathbb{N}, n \geq 1$

$2n \geq 2$

$2n+1 \geq 2+1$

$2n+1 \geq 3$

$\dfrac{1}{2n+1} \leq \dfrac{1}{3}$

$\dfrac{3}{2n+1} \leq \dfrac{3}{3} = 1$

$a_n \leq 1$

ដូចនេះ (a_n) **ជាស្ទីតទាល់លើ មានគោលលើ**

$M = 1$

15. $a_n = \dfrac{1}{n+3}$

$\forall n \in \mathbb{N}, n \geq 1$

$n+3 \geq 1+3$

$n+3 \geq 4$

$\dfrac{1}{n+3} \leq \dfrac{1}{4}$

$a_n \leq \dfrac{1}{4}$

ដូចនេះ (a_n) **ជាស្ទីតទាល់លើ មានគោលលើ**

$M = \dfrac{1}{4}$

16. $a_n = -6n+1$

$\forall n \in \mathbb{N}, n \geq 1$

$-6n \leq -6$

$-6n+1 \leq -6+1$

$a_n \leq -5$

ដូចនេះ (a_n) **ជាស្ទីតទាល់លើ មានគោលលើ**

$M = -5$

17. $a_n = \dfrac{8}{4n+1}$

$\forall n \in \mathbb{N}, n \geq 1$

$4n \geq 1$

$4n+1 \geq 4+1$

$\dfrac{1}{4n+1} \leq \dfrac{1}{5}$

$\dfrac{8}{4n+1} \leq \dfrac{8}{5}$

$a_n \leq \dfrac{8}{5}$

ដូចនេះ (a_n) **ជាស្ទីតទាល់លើ មានគោលលើ**

$M = \dfrac{8}{5}$

18. $a_n = \dfrac{4}{7n}$

$\forall n \in \mathbb{N}, n \geq 1$

$7n \geq 7$

$\dfrac{1}{7n} \leq \dfrac{1}{7}$

$\dfrac{4}{7n} \leq \dfrac{4}{7}$

$a_n \leq \dfrac{4}{7}$

ដូចនេះ (a_n) **ជាស្ទីតទាល់លើ មានគោលលើ**

$M = \dfrac{4}{7}$

19. $a_n = \dfrac{4}{5n+3}$

$\forall n \in \mathbb{N}, n \geq 1$

$5n \geq 5$

$5n+3 \geq 5+3$

$\dfrac{1}{5n+3} \leq \dfrac{1}{8}$

$\dfrac{4}{5n+3} \leq \dfrac{4}{8}$

$a_n \leq \dfrac{4}{8}$

ដូចនេះ (a_n) **ជាស្ទីតទាល់លើ មានគោលលើ**

$M = \dfrac{4}{8}$

20. $a_n = \dfrac{2}{n+2}$

$\forall n \in \mathbb{N}, n \geq 1$

$n+2 \geq 1+2$

$\dfrac{1}{n+2} \leq \dfrac{1}{3}$

$\dfrac{2}{n+2} \leq \dfrac{2}{3}$

$a_n \leq \dfrac{2}{3}$

ដូចនេះ (a_n) **ជាស្ទីតទាល់លើ មានគោលលើ**

$M = \dfrac{2}{3}$

21. $a_n = \dfrac{7}{4n}$

$\forall n \in \mathbb{N}, n \geq 1$

$4n \geq 4$

$\dfrac{1}{4n} \leq \dfrac{1}{4}$

$\dfrac{7}{4n} \leq \dfrac{7}{4}$

$a_n \leq \dfrac{7}{4}$

ដូចនេះ (a_n) **ជាស្ទីតទាល់លើ មានគោលលើ**

$M = \dfrac{7}{4}$

22. $a_n = \dfrac{5}{2n+1}$

$\forall n \in \mathbb{N}, n \geq 1$

$2n \geq 2$

$2n+1 \geq 2+1$

$\dfrac{1}{2n+1} \leq \dfrac{1}{3}$

$\dfrac{5}{2n+1} \leq \dfrac{5}{3}$

$a_n \leq \dfrac{5}{3}$

ដូចនេះ (a_n) **ជាស្ទីតទាល់លើ មានគោលលើ**

$M = \dfrac{5}{3}$

23. $a_n = -10n + 3$

$\forall n \in \mathbb{N}, n \geq 1$

$-10n \leq -10$

$-10n + 3 \leq -10 + 3$

$a_n \leq -7$

ដូចនេះ (a_n) **ជាស្ទីតទាល់លើ មានគោលលើ**

$M = -7$

24. $a_n = \frac{8}{n}$

$\forall n \in \mathbb{N}, n \geq 1$

$$\frac{n}{n} \geq \frac{1}{n}$$
$$1 \geq \frac{1}{n}$$
$$8 \geq \frac{8}{n} \Leftrightarrow \frac{8}{n} \leq 8$$
$$a_n \leq 8$$

ដូចនេះ(a_n)**ជាស្ទីតទាល់លើ មានគោលលើ**

$M = 8$

25. $a_n = \frac{3}{5n}$

$\forall n \in \mathbb{N}, n \geq 1$

$$5n \geq 5$$
$$\frac{1}{5n} \leq \frac{1}{5}$$
$$\frac{3}{5n} \leq \frac{3}{5}$$
$$a_n \leq \frac{3}{5}$$

ដូចនេះ(a_n)**ជាស្ទីតទាល់លើ មានគោលលើ**

$M = \frac{3}{5}$

26. $a_n = \frac{3}{n}$

$\forall n \in \mathbb{N}, n \geq 1$

$$\frac{n}{n} \geq \frac{1}{n}$$
$$1 \geq \frac{1}{n}$$
$$3 \geq \frac{3}{n} \Leftrightarrow \frac{3}{n} \leq 3$$
$$a_n \leq 3$$

ដូចនេះ(a_n)**ជាស្ទីតទាល់លើ មានគោលលើ**

$M = 3$

27. $a_n = \frac{3}{n+1}$

$\forall n \in \mathbb{N}, n \geq 1$

$$n+1 \geq 1+1$$
$$\frac{1}{n+1} \leq \frac{1}{2}$$
$$\frac{3}{n+1} \leq \frac{3}{2}$$
$$a_n \leq \frac{3}{2}$$

ដូចនេះ(a_n)**ជាស្ទីតទាល់លើ មានគោលលើ**

$M = \frac{3}{2}$

IV.ស្ទីតទាល់ក្រោម

1. $a_n = 5^n + 12^n$

$\forall n \in \mathbb{N}, n \geq 1$

$$5^n \geq 5^1 \quad (1)$$

$\forall n \in \mathbb{N}, n \geq 1$

$$12^n \geq 12^1 \quad (2)$$

$(1)+(2), 5^n + 12^n \geq 5 + 12$

$$a_n \geq 17$$

ដូចនេះ(a_n)**ជាស្ទីតទាល់ក្រោម** $m = 17$

2. $a_n = 20n - 10$

$\forall n \in \mathbb{N}, n \geq 1$

$$20n \geq 20$$
$$20n - 10 \geq 20 - 10$$
$$a_n \geq 10$$

ដូចនេះ(a_n)**ជាស្ទីតទាល់ក្រោម** $m = 10$

3. $b_n = 6n - 8$

$\forall n \in \mathbb{N}, n \geq 1$

$$6n \geq 6$$
$$6n - 8 \geq 6 - 8$$
$$b_n \geq -2$$

ដូចនេះ (b_n) **ជាស្ទីតទាល់ក្រោម** $m=-2$

4. $a_n=4n+2$

$\forall n\in\mathbb{N}, n\geq 1$

$4n\geq 4$

$4n+2\geq 4+2$

$a_n\geq 6$

ដូចនេះ (a_n) **ជាស្ទីតទាល់ក្រោម** $m=6$

5. $c_n=2^n+3^n$

$\forall n\in\mathbb{N}, n\geq 1$

$2^n\geq 2^1 \ (1)$

$\forall n\in\mathbb{N}, n\geq 1$

$3^n\geq 3^1 \ (2)$

$(1)+(2),\ 2^n+3^n\geq 2+3$

$c_n\geq 5$

ដូចនេះ (c_n) **ជាស្ទីតទាល់ក្រោម** $m=5$

6. $a_n=\dfrac{9^n}{5^n}$

$\forall n\in\mathbb{N}, n\geq 1$

$9^n\geq 9^1 \ (1)$

$\forall n\in\mathbb{N}, n\geq 1$

$5^n\geq 5^1 \ (2)$

យក (1) **ធៀប** $(2),\ \dfrac{9^n}{5^n}\geq\dfrac{9}{5}$

$a_n\geq\dfrac{9}{5}$

ដូចនេះ (a_n) **ជាស្ទីតទាល់ក្រោម** $m=\dfrac{9}{5}$

7. $b_n=4n-12$

$\forall n\in\mathbb{N}, n\geq 1$

$4n\geq 1\times 4$

$4n-12\geq 4-12$

$b_n\geq -8$

ដូចនេះ (b_n) **ជាស្ទីតទាល់ក្រោម** $m=-8$

8. $a_n=5^n-7^n$

$\forall n\in\mathbb{N}, n\geq 1$

$5^n\geq 5^1 \ (1)$

$\forall n\in\mathbb{N}, n\geq 1$

$7^n\geq 7 \ (2)$

$(1)-(2)\ 5^n-7^n\geq 5-7$

$a_n\geq -2$

ដូចនេះ (a_n) **ជាស្ទីតទាល់ក្រោម** $m=-2$

9. $a_n=10n+2$

$\forall n\in\mathbb{N}, n\geq 1$

$10n\geq 1\times 10$

$10n+2\geq 10+2$

$a_n\geq 12$

ដូចនេះ (a_n) **ជាស្ទីតទាល់ក្រោម** $m=12$

10. $a_n=\dfrac{3^n}{2^n}$

$\forall n\in\mathbb{N}, n\geq 1$

$3^n\geq 3^1$

$\forall n\in\mathbb{N}, n\geq 1$

$2^n\geq 2^1$

យក (1) **ធៀប** $(2),\ \dfrac{3^n}{2^n}\geq\dfrac{3}{2}$

$a_n\geq\dfrac{3}{2}$

ដូចនេះ (a_n) **ជាស្ទីតទាល់ក្រោម** $m=\dfrac{3}{2}$

V.ស្ទីតម៉ូណូតូន

1. $a_n = 2(-1)^n$

. $a_1 = 2(-1)^1 = -2$

. $a_2 = 2(-1)^2 = 2$

. $a_3 = 2(-1)^3 = -2$

$a_1 < a_2 > a_3 ...$

ដូចនេះ(a_n)**មិនមែនជាស្ទីតម៉ូណូតូនទេ។**

2. $a_n = \frac{n}{2^n}$

. $a_1 = \frac{1}{2^1} = \frac{1}{2}$

. $a_2 = \frac{2}{2^2} = \frac{2}{4} = \frac{1}{2}$

. $a_3 = \frac{3}{2^3} = \frac{3}{8}$

$a_1 = a_2 > a_3 ...$

ដូចនេះ(a_n)**មិនមែនជាស្ទីតម៉ូណូតូនទេ។**

3. $a_n = n^2 - 3n + 2$

. $a_1 = 1^2 - 3(1) + 2 = 0$

. $a_2 = 2^2 - 3(2) + 2 = 0$

. $a_3 = 3^2 - 3(3) + 2 = 2$

$a_1 = a_2 < a_3 ...$

ដូចនេះ(a_n)**មិនមែនជាស្ទីតម៉ូណូតូនទេ។**

4. $a_n = 2n^2 - 1$

. $a_1 = 2(1)^2 - 1 = 1$

. $a_2 = 2(2)^2 - 1 = 7$

. $a_3 = 2(3)^2 - 1 = 17$

$a_1 < a_2 < a_3 ...$

ដូចនេះ(a_n)**ជាស្ទីតម៉ូណូតូន។**

5. $a_n = 3n + 2$

. $a_1 = 3(1) + 2 = 5$

. $a_2 = 3(2) + 2 = 8$

. $a_3 = 3(3) + 2 = 11$

$a_1 < a_2 < a_3 ...$

ដូចនេះ(a_n)**ជាស្ទីតម៉ូណូតូន។**

6. $a_n = \frac{3n^2 + 2n + 1}{2n + 2}$

. $a_1 = \frac{3(1)^2 + 2(1) + 1}{2(1) + 2} = \frac{6}{4} = \frac{3}{2}$

. $a_2 = \frac{3(2)^2 + 2(2) + 1}{2(2) + 2} = \frac{17}{5}$

. $a_3 = \frac{3(3)^2 + 2(3) + 1}{2(3) + 2} = \frac{34}{8} = \frac{17}{4}$

$a_1 < a_2 < a_3 ...$

ដូចនេះ(a_n)**ជាស្ទីតម៉ូណូតូន។**

7. $a_n = \left(\frac{3n^2 + 1}{2n - 1}\right)^2$

. $a_1 = \left(\frac{3(1)^2 + 1}{2(1) - 1}\right)^2 = (4)^2 = 16$

. $a_2 = \left(\frac{3(2)^2 + 1}{2(2) - 1}\right)^2 = \left(\frac{13}{3}\right)^2 = 19.77$

. $a_3 = \left(\frac{3(3)^2 + 1}{2(3) - 1}\right) = \left(\frac{28}{5}\right)^2 = 31.36$

$a_1 < a_2 < a_3 ...$

ដូចនេះ(a_n)**ជាស្ទីតម៉ូណូតូន។**

8. $a_n = \frac{\sqrt{3n} + 2}{2}$

. $a_1 = \frac{\sqrt{3(1)} + 2}{2} = \frac{\sqrt{3} + 2}{2}$

. $a_2 = \frac{\sqrt{3(2)} + 2}{2} = \frac{\sqrt{6} + 2}{2}$

. $a_3 = \frac{\sqrt{3(3)} + 2}{2} = \frac{\sqrt{9} + 2}{2}$

$a_1 < a_2 < a_3 ...$

ដូចនេះ(a_n)ជាស្ទីតម៉ូណូតូន។

9. $a_n = \left(\frac{\sqrt{3n}-2}{2}\right)^2$

. $a_1 = \left(\frac{\sqrt{3(1)}-2}{2}\right)^2 = \frac{3-4}{4} = \frac{-1}{4}$

. $a_2 = \left(\frac{\sqrt{3(2)}-2}{2}\right)^2 = \frac{6-4}{4} = \frac{2}{4} = \frac{1}{2}$

. $a_3 = \left(\frac{\sqrt{3(3)}-2}{2}\right)^2 = \frac{9-4}{4} = \frac{5}{4}$

$a_1 < a_2 < a_3 ...$

ដូចនេះ(a_n)ជាស្ទីតម៉ូណូតូន។

10. $a_n = \frac{4n^2+2n}{5}$

. $a_1 = \frac{4(1)^2+2(1)}{5} = \frac{6}{5}$

. $a_2 = \frac{4(2)^2+2(2)}{5} = \frac{20}{5} = 4$

. $a_3 = \frac{4(3)^2+2(3)}{5} = \frac{42}{5}$

$a_1 < a_2 < a_3 ..$

ដូចនេះ(a_n)ជាស្ទីតម៉ូណូតូន។

11. $a_n = \frac{3n^2+2n}{7}$

. $a_1 = \frac{3(1)^2+2(1)}{7} = \frac{5}{7}$

. $a_2 = \frac{3(2)^2+2(2)}{7} = \frac{16}{7}$

. $a_3 = \frac{3(3)^2+2(3)}{7} = \frac{33}{7}$

$a_1 < a_2 < a_3 ...$

ដូចនេះ(a_n)ជាស្ទីតម៉ូណូតូន។

12. $a_n = 4n^4 - 8n - 1$

. $a_1 = 4(1)^4 - 8(1) - 1 = -5$

. $a_2 = 4(2)^4 - 8(2) - 1 = 47$

. $a_3 = 4(3)^2 - 8(3) - 1 = 299$

$a_1 < a_2 < a_3 ...$

ដូចនេះ(a_n)ជាស្ទីតម៉ូណូតូន។

13. $a_n = 5n^4 - 2n^3 - n^2 + n$

. $a_1 = 5(1)^4 - 2(1)^3 - (1)^2 + 1 = 3$

. $a_2 = 5(2)^4 - 2(2)^3 - (2)^2 + 2 = 62$

. $a_3 = 5(3)^4 - 2(3)^3 - (3)^2 + 3 = 345$

$a_1 < a_2 < a_3 ...$

ដូចនេះ(a_n)ជាស្ទីតម៉ូណូតូន។

14. $a_n = \frac{6n^2-2n^2+n}{2n}$

. $a_1 = \frac{6(1)^2-2(1)^2+1}{2(1)} = \frac{5}{2}$

. $a_2 = \frac{6(2)^2-2(2)^2+2}{2(2)} = \frac{20}{4} = 5$

. $a_3 = \frac{6(3)^2-2(3)^2+3}{2(3)} = \frac{39}{6}$

$a_1 < a_2 < a_3 ...$

ដូចនេះ(a_n)ជាស្ទីតម៉ូណូតូន។

15. $a_n = 2(-1)^n + n - 2n$

. $a_1 = 2(-1)^1 + (1) - 2(1) = -3$

. $a_2 = 2(-1)^2 + (2) - 2(2) = 0$

. $a_3 = 2(-1)^3 + (3) - 2(3) = -5$

$a_1 < a_2 > a_3 ...$

ដូចនេះ(a_n)មិនមែនជាស្ទីតម៉ូណូតូនទេ។

16. $a_n = 2(-2)^n - 3n^2 + n$

. $a_1 = 2(-2)^1 - 3(1)^2 + 1 = -6$

. $a_2 = 2(-2)^2 - 3(2)^2 + 2 = -2$

. $a_3 = 2(-2)^3 - 3(3)^2 + 3 = -60$

$a_1 < a_2 > a_3 ...$

ដូចនេះ(a_n)**មិនមែនជាស្ទីតម៉ូណូតូនទេ។**

17. $a_n = \dfrac{2(-1)^n - 2n^2 - n}{3n}$

. $a_1 = \dfrac{2(-1)^1 - 2(1)^2 - (1)}{3(1)} = \dfrac{-5}{3}$

. $a_2 = \dfrac{2(-1)^2 - 2(2)^2 - (2)}{3(2)} = -\dfrac{8}{6} = -\dfrac{4}{3}$

. $a_3 = \dfrac{2(-1)^3 - 2(3)^2 - (3)}{3(3)} = -\dfrac{23}{9}$

$a_1 > a_2 < a_3 \ldots$

ដូចនេះ(a_n)**មិនមែនជាស្ទីតម៉ូណូតូនទេ។**

18. $a_n = \left(\dfrac{9n^3 + 3n^2 + 3}{3}\right)^2$

. $a_1 = \left(\dfrac{9(1)^3 + 3(1)^2 + 3}{3}\right)^2 = 5^2 = 25$

. $a_2 = \left(\dfrac{9(2)^3 + 3(2)^2 + 3}{3}\right) = 29^2 = 841$

. $a_3 = \left(\dfrac{9(3)^3 + 3(3)^2 + 3}{3}\right) = 91^2 = 8281$

$a_1 < a_2 < a_3 \ldots$

ដូចនេះ(a_n)**ជាស្ទីតម៉ូណូតូន។**

19. $a_n = \sqrt{\dfrac{n^4 + 2n^2 - 1}{2}}$

. $a_1 = \sqrt{\dfrac{(1)^4 + 2(1)^2 - 1}{2}} = \sqrt{\dfrac{2}{2}} = \sqrt{1} = 1$

. $a_2 = \sqrt{\dfrac{(2)^4 + 2(2)^2 - 1}{2}} = \sqrt{\dfrac{22}{2}} = \sqrt{11}$

$a_1 > a_2 \ldots$

ដូចនេះ(a_n)**ជាស្ទីតម៉ូណូតូន។**

20. $a_n = \left(\dfrac{3n^2 + 2n - n}{2}\right)^3$

. $a_1 = \left(\dfrac{3(1)^2 + 2(1) - 1}{2}\right)^3 = \left(\dfrac{4}{2}\right)^3 = 2^3 = 8$

. $a_2 = \left(\dfrac{3(2)^2 + 2(2) - 2}{2}\right)^3 = \left(\dfrac{14}{2}\right)^3 = 7^3 = 343$

. $a_3 = \left(\dfrac{3(3)^2 + 2(3) - 3}{2}\right) = 15^3 = 3375$

$a_1 < a_2 < a_3 \ldots$

ដូចនេះ(a_n)**ជាស្ទីតម៉ូណូតូន។**

VI.ស្ទីតនព្ធន្ត

ក, គណនាតួទី n

1. (a_n) 5,12,19...

តាមរូបមន្ត $a_n = a_1 + (n-1)d$

ដោយ $a_1 = 5$

$$\begin{aligned} d &= a_2 - a_1 \\ &= 12 - 5 = 7 \\ \Rightarrow a_n &= 5 + (n-1)d \\ &= 5 + 7n - 7 \\ &= 7n - 2 \end{aligned}$$

2. (a_n) 100,95,90,...

តាមរូបមន្ត $a_n = a_n(n-1)d$

ដោយ $a_1 = 100$

$$\begin{aligned} d &= a_2 - a_1 \\ &= 95 - 100 = -5 \\ \Rightarrow a_n &= 100 + (n-1)(-5) \\ &= 100 - 5n + 5 \\ &= -5n + 105 \end{aligned}$$

$3.(a_n) = -8, -3, 2, 7, \ldots$

តាមរូបមន្ត $a_n = a_1 + (n-1)d$

ដោយ $a_1 = -8$

$$\begin{aligned} d &= a_2 - a_1 \\ &= -3 - (-8) = 5 \\ \Rightarrow a_n &= (-8) + (n-1)5 \\ &= -8 + 5n - 5 \\ &= 5n - 13 \end{aligned}$$

$4.(a_n) = 2, 4, 6, \ldots$

តាមរូបមន្ត $a_n = a_1 + (n-1)d$

ដោយ $a_1 = 2$

$$\begin{aligned} d &= a_2 - a_1 \\ &= 4 - 2 = 2 \\ \Rightarrow a_n &= 2 + (n-1)2 \\ &= 2 + 2n - 2 \\ &= 2n \end{aligned}$$

$5.(a_n) - 9, -4, 1, \ldots$

តាមរូបមន្ត $a_n = a_1 + (n-1)d$

ដោយ $a_1 = -9$

$$\begin{aligned} d &= a_2 - a_1 \\ &= -4 - (-9) = 5 \\ \Rightarrow a_n &= -9 + (n-1)5 \\ &= -9 + 5n - 5 \\ &= 5n - 14 \end{aligned}$$

$6.(a_n) 4, 15, 26, \ldots$

តាមរូបមន្ត $a_n = a_1 + (n-1)d$

ដោយ $a_1 = 4$

$$\begin{aligned} d &= a_2 - a_1 \\ &= 15 - 4 = 11 \\ \Rightarrow a_n &= 4 + (n-1)11 \\ &= 4 + 11n - 11 \\ &= 11n - 7 \end{aligned}$$

$7.(a_n) 5, 1, -3, -7, -11, \ldots$

តាមរូបមន្ត $a_n = a_1 + (n-1)d$

ដោយ $a_1 = 5$

$$\begin{aligned} d &= a_2 - a_1 \\ &= 1 - 5 = -4 \\ \Rightarrow a_n &= 5 + (n-1)(-4) \\ &= 5 - 4n + 4 \\ &= -4n + 9 \end{aligned}$$

$8.(a_n) - 2, -9, -16, \ldots$

តាមរូបមន្ត $a_n = a_1 + (n-1)d$

ដោយ $a_1 = -2$

$$d = a_2 - a_1$$
$$= -9 - (-2) = -7$$
$$\Rightarrow a_n = -2 + (n-1)(-7)$$
$$= -2 - 7n + 7$$
$$= -7n + 5$$

9.$(a_n)7,12,17,...$

តាមរូបមន្ត $a_n = a_1 + (n-1)d$

ដោយ $a_1 = 7$

$$d = a_2 - a_1$$
$$= 12 - 7 = 5$$

$$\Rightarrow a_n = 7 + (n-1)5$$
$$= 7 + 5n - 5$$
$$= 5n + 2$$

10.$(a_n)8,13,18,...$

តាមរូបមន្ត $a_n = a_1 + (n-1)d$

ដោយ $a_1 = 8$

$$d = a_2 - a_1$$
$$= 13 - 8 = 5$$
$$\Rightarrow a_n = 8 + (n-1)5$$
$$= 8 + 5n - 5$$
$$= 5n + 3$$

11.$(a_n)1,3,5,...$

តាមរូបមន្ត $a_n = a_1 + (n-1)d$

ដោយ $a_1 = 1$

$$d = a_2 - a_1$$
$$= 3 - 1 = 2$$
$$\Rightarrow a_n = 1 + (n-1)2$$
$$= 1 + 2n - 2$$
$$= 2n - 1$$

12.$(a_n)\frac{1}{2},\frac{7}{2},\frac{13}{2},\frac{19}{2}$

តាមរូបមន្ត $a_n = a_1 + (n-1)d$

ដោយ $a_1 = \frac{1}{2}$

$$d = a_2 - a_1$$
$$= \frac{7}{2} - \frac{1}{2} = \frac{6}{2}$$

$$\Rightarrow a_n = \frac{1}{2} + (n-1)\frac{6}{2}$$
$$= \frac{1}{2} + \frac{6}{2}n - \frac{6}{2}$$
$$= \frac{6}{2}n - \frac{5}{2}$$

13.$(a_n)5,10,15,...$

តាមរូបមន្ត $a_n = a_1 + (n-1)d$

ដោយ $a_1 = 5$

$$d = a_2 - a_1$$
$$= 10 - 5 = 5$$
$$\Rightarrow a_n = 5 + (n-1)5$$
$$= 5 + 5n - 5$$
$$= 5n$$

14.$(a_n)8,17,26,...$

តាមរូបមន្ត $a_n = a_1 + (n-1)d$

ដោយ $a_1 = 8$

$$d = a_2 - a_1$$
$$= 17 - 8 = 9$$
$$\Rightarrow a_n = 8 + (n-1)9$$
$$= 8 + 9n - 9$$
$$= 9n - 1$$

15.$(a_n)1,13,25,...$

តាមរូបមន្ត $a_n = a_1 + (n-1)d$

ដោយ $a_1 = 1$

$$d = a_2 - a_1$$
$$= 13 - 1 = 12$$

$$\Rightarrow a_n = 1 + (n-1)12$$
$$= 1 + 12n - 12$$
$$= 12n - 11$$

16.$(a_n)115,100,85,...$

តាមរូបមន្ត $a_n = a_1 + (n-1)d$

ដោយ $a_1 = 115$

$$d = a_2 - a_1$$
$$= 100 - 115 = -15$$
$$\Rightarrow a_n = 115 + (n-1)(-15)$$
$$= 115 + -15n + 15$$
$$= -15n + 130$$

17.$(a_n) -10,-5,0,5,...$

តាមរូបមន្ត $a_n = a_1 + (n-1)d$

ដោយ $a_1 = -10$

$$d = a_2 - a_1$$
$$= -5 - (-10) = 5$$
$$\Rightarrow a_n = -10 + (n-1)5$$
$$= -10 + 5n - 5$$
$$= 5n - 15$$

18.$(a_n)\frac{9}{2},6,\frac{15}{2},9,...$

តាមរូបមន្ត $a_n = a_1 + (n-1)d$

ដោយ $a_1 = \frac{9}{2}$

$$d = a_2 - a_1$$
$$= 6 - \frac{9}{2} = \frac{3}{2}$$

$$\Rightarrow a_n = \frac{9}{2} + (n-1)\frac{3}{2}$$
$$= \frac{9}{2} + \frac{3}{2}n - \frac{3}{2}$$
$$= \frac{3n}{2} + 3$$

19.$(a_n)3\sqrt{3},6\sqrt{3},9\sqrt{3},...$

តាមរូបមន្ត $a_n = a_1 + (n-1)d$

ដោយ $a_1 = 3\sqrt{3}$

$$d = a_2 - a_1$$
$$= 6\sqrt{3} - 3\sqrt{3} = 3\sqrt{3}$$
$$\Rightarrow a_n = 3\sqrt{3} + (n-1)3\sqrt{3}$$
$$= 3\sqrt{3} + 3\sqrt{3}n - 3\sqrt{3}$$
$$= 3\sqrt{3}n$$

20. $(a_n)\sqrt{3},2\sqrt{3},3\sqrt{3}$

តាមរូបមន្ត $a_n = a_1 + (n-1)d$

ដោយ $a_1=\sqrt{3}$

$$\begin{aligned}d&=a_2-a_1\\&=2\sqrt{3}-\sqrt{3}=\sqrt{3}\end{aligned}$$

$$\begin{aligned}\Rightarrow a_n&=\sqrt{3}+(n-1)\sqrt{3}\\&=\sqrt{3}+\sqrt{3}n-\sqrt{3}\\&=\sqrt{3}\end{aligned}$$

21.(a_n) $\sqrt{2},6\sqrt{2},11\sqrt{2},16\sqrt{2}$

តាមរូបមន្ត $a_n=a_1+(n-1)d$

ដោយ $a_1=\sqrt{2}$

$$\begin{aligned}d&=a_2-a_1\\&=6\sqrt{2}-\sqrt{2}=5\sqrt{2}\end{aligned}$$

$$\begin{aligned}\Rightarrow a_n&=\sqrt{2}+(n-1)5\sqrt{2}\\&=\sqrt{2}+5\sqrt{2}n-5\sqrt{2}\\&=5n\sqrt{2}-4\sqrt{2}\end{aligned}$$

ខ, ស្ទីតនព្វន្តកម្រិតខ្ពស់

1. ក, គណនាតួទី n

តាមរូបមន្ត $a_n=a_1+(n-1)d$

ដោយ $a_1=4$, $d=7-4=3$

$$\begin{aligned}\Rightarrow a_n&=4+(n-1)d\\&=4+3n-3=3n+1\end{aligned}$$

ខ , គណនាចំនួនតួនៃស្ទីត

ដោយ $a_n=3n+1$, $3n+1$

$$\Rightarrow 31=3n+1$$

$$3n=31-1\Rightarrow n=\frac{30}{3}=10$$

ដូចនេះ $\begin{aligned}a_n&=3n+1\\n&=10\end{aligned}$

2.ក, រកតួទី n

តាមរូបមន្ត $a_n=a_1+(n-1)d$

ដោយ $a_1=1,d=7-1=6$

$$\begin{aligned}\Rightarrow a_n&=1+(n-1)6\\&=1+6n-6=6n-5\end{aligned}$$

ខ , គណនាតម្លៃនៃតួទី 10

ដោយ $a_n=6n-5$

$$\Rightarrow a_{10}=6\times10-5=55$$

គ , គណនាចំនួនតួនៃតម្លៃ115

ដោយ $a_n=6n-5,a_n=115$

$$\Rightarrow 115=6n-5$$

$$6n=120\Rightarrow n=\frac{120}{6}=20$$

ដូចនេះ $\begin{aligned}a_n&=6n-5\\a_{10}&=55\\n&=20\end{aligned}$

3. ក, រកតួទីn

តាមរូបមន្ត $a_n=a_p+(n-p)d$

ដោយ $a_p=a_{35}=9$

$$d=\frac{a_\alpha-a_\beta}{\alpha-\beta}=\frac{17-9}{45-35}=\frac{4}{5}$$

$$\Rightarrow a_n = 9+(n-35)\frac{4}{5}$$
$$= 9+\frac{4}{5}n-35\times\frac{4}{5}$$
$$= \frac{4}{5}n-28+9 = \frac{4}{5}n-19$$

ខ, រកតួទី 40

ដោយ $a_n = \frac{4}{5}n-19$

$$\Rightarrow a_{40} = \frac{4}{5}\times 40-19 = 13$$

ដូចនេះ $a_n = \frac{4}{5}n-19$
$a_{40} = 13$

4. **ក, គណនាតួទី**20

តាមរូបមន្ត $a_n = a_1+(n-1)d$

ដោយ $a_1 = 2$

$$d = a_2-a_1$$
$$= 4-2 = 2$$
$$\Rightarrow a_n = 2+(n-1)2$$
$$= 2+2n-2$$
$$a_n = 2n$$
$$\Rightarrow a_{20} = 2\times 20$$
$$= 40$$

ដូចនេះ $a_{20} = 40$

ខ , រកចំនួន 236

តាមរូបមន្ត $a_n = a_1+(n-1)d$

ដោយ $a_1 = 2$

$$d = 2$$
$$a_n = 236$$
$$\Rightarrow a_n = a_1+(n-1)d$$
$$236 = 2+(n-1)2$$
$$n = \frac{236}{2} = 118$$

ដូចនេះ $n = 118$

5.**ក**, **រកតួទី** n

តាមរូបមន្ត $a_n = a_1+(n-1)d$

ដោយ $a_1 = -9$

$$d = a_2-a_1$$
$$= -4-(-9) = +5$$
$$\Rightarrow a_n = -9+(n-1)d$$
$$= -9+5n-5$$
$$= 5n-14$$

ខ , គណនាតួទី 50

ដោយ $a_n = 5n-14$

$$\Rightarrow a_{50} = 5\times 50-14$$
$$= 236$$

គ , រកចំនួន 171

តាមរូបមន្ត $a_n = a_1+(n-1)d$

ដោយ $a_n = 171$

$$a_1 = -9$$
$$d = a_1 - a_2$$
$$= -4 - (-9)$$
$$= 5$$
$$\Rightarrow a_n = a_1 + (n-1)d$$
$$171 = 5n - 14$$
$$171 + 14 = 5n$$
$$185 = 5n$$
$$n = 37$$

6. **ក.គណនាតួទី** n

តាមរូបមន្ត $a_n = a_1 + (n-1)d$

ដោយ $a_p = a_{15} = 29$

$$d = \frac{a_\alpha - a_\beta}{\alpha - \beta}$$
$$= \frac{a_{25} - a_{15}}{25 - 15}$$
$$= \frac{49 - 29}{25 - 15} = \frac{20}{10} = 2$$
$$\Rightarrow a_n = 29 + (n-15)^2$$
$$a_n = 29 + 2n - 30 = 2n - 1$$

ខ. គណនាតួទី40

ដោយ $2n-1$

$$\Rightarrow a_{40} = 2(40) - 1 = 79$$

7. **គណនាតួទី**n **និង** 20**តួដំបូង**

+គណនាតួទីn

តាមរូបមន្ត $a_n = a_1 + (n-1)d$

ដោយ $a_1 = 3, d = 5 - 3 = 2$

$$\Rightarrow a_n = 3 + (n-1)2$$
$$= 3 + 2n - 2 = 2n + 1$$

+គណនាតួទី20

ដោយ $a_n = 2n + 1$

$$\Rightarrow a_{20} = 2(20) + 1 = 41$$

ខ. គណនាផល20**បូកតួដំបូង**

តាមរូបមន្ត $s_n = \frac{n}{2}(a_1 + a_n)$

$$\Rightarrow a_{20} = \frac{20}{2}(a_1 + a_{20})$$

ដោយ $a_1 = 3, a_{20} = 41$

$$\Rightarrow s_{20} = \frac{20}{2}(3 + 41) = 10 \times 44 = 440$$

8. **ក, គណនាតួទី**n **និង តួទី**40

+គណនាតួទីn

តាមរូបមន្ត $a_n = a_1 + (n-1)d$

ដោយ $a_p = a_{20} = 61$

$$d = \frac{a_\alpha - a_\beta}{\alpha - \beta}$$
$$= \frac{a_{30} - a_{20}}{30 - 20} = \frac{91 - 61}{30 - 20} = \frac{30}{10} = 3$$

$$\Rightarrow a_n = 61 + (n-20)3$$
$$= 61 + 3n - 60 = 3n + 1$$

+គណនាតួទី40

ដោយ $a_n = 3n + 1$

$$\Rightarrow a_{40} = 3(40) + 1 = 121$$

ខ, គណនាផលបូក40**តួដំបូង**

តាមរូបមន្ត $s_n = \frac{n}{2}(a_1 + a_n)$

$\Rightarrow a_{40} = \frac{40}{2}(a_1 + a_{40})$

ដោយ $a_1 = 3n + 1 = 3 \times 1 + 1 = 4$

$a_{40} = 121$

$\Rightarrow s_{40} = \frac{40}{2}(4 + 121) = 20 \times 125 = 2500$

9. **ក, តាមរូបមន្ត** $a_n = a_1 + (n-1)d$

ដោយ $a_n = 58, a_1 = 1, d = 4 - 1 = 3$

$\Rightarrow 58 = 1 + (n-1)3$

$58 = 1 + 3n - 3$

$3n = 60 \Rightarrow n = \frac{60}{3} = 20$

នោះ $s_n = \frac{n}{2}(a_1 + a_n)$

$s_{20} = \frac{20}{2}(1 + a_{20})$

$\Rightarrow s_{20} = 10(1 + 58)$

$= 590$

ខ, តាមរូបមន្ត $a_n = a_1 + (n-1)d$

ដោយ $a_n = 65, a_1 = 115, d = -5$

$\Rightarrow 65 = 115 + (n-1)(-5)$

$65 = 115 + (-5n + 5)$

$65 = 115 - 5n + 5$

$5n = 115 + 5 - 65$

$\Rightarrow n = \frac{185}{5} = 35$

$\Rightarrow s_n = \frac{n}{2}(a_1 + a_n)$

$s_{35} = \frac{35}{2}(115 + 65)$

$s_{35} = \frac{2275}{2} + \frac{4025}{2} = 3150$

10, 1, **ក, គណនាតួទី**20

តាមរូបមន្ត $a_n = a_1 + (n-1)d$

ដោយ $a_1 = 1, d = 13 - 1 = 12$

$\Rightarrow a_{20} = 1 + (20-1)12$

$= 1 + 19 \times 12 = 229$

ខ, គណនាផលបូក20**តួដំបូង**

តាមរូបមន្ត $s_n = \frac{n}{2}(a_1 + a_n)$

$\Rightarrow s_{20} = \frac{20}{2}(1 + a_{20})$

$= 10(1 + 229) = 2300$

2, **ក, គណនាតួទី**20

តាមរូបមន្ត $a_n = a_1 + (n-1)d$

ដោយ $a_1 = 18, d = 13 - 18 = -5$

$\Rightarrow a_{25} = 18 + (25-1)(-5)$

$= 18 - 125 + 5 = -102$

ខ, គណនាផលបូក25**តួដំបូង**

តាមរូបមន្ត $s_n = \frac{n}{2}(a_1 + a_n)$

$$\Rightarrow a_{25}=\frac{25}{2}(18+a_{15})$$
$$=\frac{25}{2}(18-102)$$
$$=\frac{25}{2}(-84)$$
$$=\frac{-2100}{2}=-1050$$

11, **គណនា** $d,a_1,a_n,a_{10},s_{10},$

$$+a_n=a_1+(n-1)d$$
$$20=a_1+(5-1)d$$
$$20=a_1+4d$$
$$\Rightarrow a_1+4d=20 \qquad (1)$$

$$+s_n=\frac{n}{2}(a_1+a_n)$$
$$12=\frac{2}{2}(a_1+a_2)$$
$$12=\frac{2}{2}(a_1+a_1+d)$$
$$12=2a_1+d$$
$$\Rightarrow 2a_1+d=12 \qquad (2)$$

យក(1)**ធៀប**(2)

$$\begin{cases} a_1+4d=20 \\ 2a_1+d=12 \\ -2a_1-8d=-40 \\ 2a_1+d=12 \end{cases}$$
$$-7d=-28\Rightarrow d=\frac{-28}{-7}=4$$

យកd=4**ជួសចូល**(1)

$$a_1+4\times 4=20$$
$$a_1=4$$

+រក a_n

តាមរូបមន្ត $a_n=a_1+(n-1)d$

ដោយ $a_1=4,d=4$

$$\Rightarrow a_n=4+(n-1)d$$
$$a_n=4+4n-4=4n$$

+រក a_{10}

ដោយ $a_n=4n$

$$\Rightarrow a_{10}=4\times 10=40$$

+រក s_n

តាមរូបមន្ត $s_n=\frac{n}{2}(a_1+a_n)$

$$\Rightarrow s_{10}=\frac{10}{2}(a_1+a_{10})$$

ដោយ $a_1=4,a_{10}=40$

$$\Rightarrow s_{10}=\frac{10}{2}(4+40)$$
$$s_{10}=5(44)$$
$$s_{10}=220$$

ដូចនេះ

$$\boxed{d=4,a_1=4,a_n=4n,a_{10}=40,s_{10}=220}$$

12, **+រក** a_1 & d

-តាមរូបមន្ត $a_n=a_1+(n-1)d$

$$\Rightarrow a_4=a_1+3d \quad (1)$$

- តាមរូបមន្ត $s_n=\frac{n}{2}(a_1+a_n)$

$$\Rightarrow s_2=\frac{2}{2}(a_1+a_n)$$

$4 = 2a_1 + d \qquad (2)$

យក(1)និង(2)

$$-\begin{cases} a_1+3d=7 & (\times 2) \\ 2a_1+d=12 \end{cases}$$
$$5d = 10$$
$$\Rightarrow d = 2$$

យក $d = 2$ **ជួសចូល**(1)

$$\Rightarrow a_1 + 3\times 2 = 7$$
$$a_1 = 7 - 6 = 1$$

ដូចនេះ $\boxed{d = 2, a_1 = 1}$

+រក a_n

តាមរូបមន្ត $a_n = a_1 + (n-1)d$

$$= 1 + (n-1)2$$
$$= 2 + 2n - 2 = 2n$$

+រក a_8

ដោយ $a_n = 2n$

$$\Rightarrow a_8 = 2\times 8 = 16$$

+រក s_8

តាមរូបមន្ត $s_n = \frac{n}{2}(a_1 + a_n)$

$$\Rightarrow s_8 = \frac{8}{2}(1 + a_8)$$
$$= 4(1+16) = 68$$

ដូចនេះ $\boxed{\begin{aligned} a_n &= 2n \\ a_8 &= 16 \\ s_8 &= 68 \end{aligned}}$

13, **+រក** a_n

- **តាមរូបមន្ត** $s_n = \frac{n}{2}(a_1 + a_n)$

$$\Rightarrow s_2 = \frac{2}{2}(a_1 + a_2)$$
$$12 = 2a_1 + d \qquad (1)$$

- **តាមរូបមន្ត** $s_n = \frac{n}{2}(a_1 + a_n)$

$$\Rightarrow s_5 = \frac{5}{2}(a_1 + a_5)$$
$$45 = \frac{5}{2}(2a_1 + 4d)$$
$$45 = 5a_1 + 10d \qquad (2)$$

យក(1)និង(2)

$$-\begin{cases} 2a_1+d=12 & (\times 10) \\ 5a_1+10d=45 \end{cases}$$
$$15a_1 = 75$$
$$\Rightarrow a_1 = 5$$

យក $a_1 = 5$ **ជួសចូល**(1)

$$5\times 2 + d = 12 \Rightarrow d = 12 - 10 = 2$$

$$\Rightarrow a_n = a_1 + (n-1)d$$
$$= 5 + (n-1)2$$
$$= 5 + 2n - 2 = 2n + 3$$

ដូចនេះ $\boxed{a_n = 2n + 3}$

+រក s_n

តាមរូបមន្ត $s_n = \frac{n}{2}(a_1 + a_n)$

$\Rightarrow s_n = \frac{n}{2}(5+2n+3)$
$= \frac{n}{2}(2n+8)$
$= n^2+4n$

+រក a_{20} & s_{20}

-ដោយ $a_n = 2n+3$

$\Rightarrow a_{20} = 2\times 20+3 = 43$

-ដោយ $s_n = n^2+4n$

$\Rightarrow s_{20} = 20^2+(4\times 20) = 480$

VII.ស្ទីតធរណីមាត្រ

1. $5,30,180,1080,\ldots$

តាមរូបមន្ត $q = \frac{v_2}{v_1} = \frac{30}{5} = 6$

$.q_1 = 5$
$.q_2 = q_1\times 6 = 30$
$.q_3 = q_2\times 6 = 180$
$.q_4 = q_3\times 6 = 1080$
$.q_5 = q_4\times 6 = 6480$
$.q_6 = q_5\times 6 = 38\ 880$
$.q_7 = q_6\times 6 = 233\ 280$

ដូចនេះ **ផលធៀប រួមនៃស្ទីតធរណីមាត្របីតួគឺ**

$5,30,180,1080,6480,38880,233280$

2. $-2,-8,-32,-128,$

តាមរូបមន្ត $q = \frac{v_2}{v_1} = \frac{-8}{-2} = 4$

$.v_1 = -2$
$.v_2 = v_1\times 4 = -8$
$.v_3 = v_2\times 4 = -32$
$.v_4 = v_3\times 4 = -128$
$.v_5 = v_4\times 4 = -512$
$.v_6 = v_5\times 4 = -2048$
$.v_7 = v_6\times 4 = -8192$

ដូចនេះ **ផលធៀបរួមនៃស្ទីតធរណីមាត្របីតួគឺ**

$-2,-8,-32,-128,-512,-2048,-8192$

3. $\frac{1}{4},-\frac{1}{12},\frac{1}{36},-\frac{1}{108}$

តាមរូបមន្ត $q = \frac{v_2}{v_1} = \frac{-\frac{1}{12}}{\frac{1}{4}} = -3$

$a_5 = a_4\times(-3) = \frac{1}{324}$
$a_6 = a_5\times(-3) = -\frac{1}{972}$
$a_7 = a_6\times(-3) = \frac{1}{2916}$

ដូចនេះ $a_1 = \frac{1}{4}, a_2 = -\frac{1}{12}, a_3 = \frac{1}{36},$
$a_4 = -\frac{1}{108}, a_5 = \frac{1}{324}, a_6 = -\frac{1}{972},$
$a_7 = \frac{1}{2916}$

4, គេឲស្ទីតធរណីមាត្រ $3,9,27,81,\ldots$

ក, គណនាតួទី7

តាមរូបមន្ត $u_n = u_1\times q^{n-1}$

ដោយ $u_1 = 3, q = \frac{v_2}{v_1} = \frac{9}{3} = 3$

$\Rightarrow u_7 = 3\times 3^{7-1} = 3^7$

ខ, តើចំនួន13122ជាតួទីប៉ុន្មាននៃស្ទីត?

តាមរូបមន្ត $u_n = u_1 \times q^{n-1}$

ដោយ $u_n = 13122, u_1 = 3, q = 3$

$$\Rightarrow 13122 = 3 \times 3^{n-1}$$
$$13122 = 3^n$$
$$3^8 = 3^n \Rightarrow n = 8$$

5. **គេអោយស្ទីតធរណីមាត្រ** $6, 24, 96, 384$

ក, គណនា u_{11}

តាមរូបមន្ត $u_n = u_1 \times q^{n-1}$

ដោយ $u_1 = 6, q = \frac{24}{6} = 4$

$$\Rightarrow u_{11} = 6 \times 4^{11-1} = 6 \times 10^4$$
$$= 1048476 \times 6 = 6290856$$

ខ, តើចំនួន6144ជាតួទីប៉ុន្មាន?

តាមរូបមន្ត $u_n = u_1 \times q^{n-1}$

ដោយ $u_n = 6144$

$$\Rightarrow 6144 = 6 \times 4^{n-1}$$
$$1024 = 4^{n-1}$$
$$4^5 = 4^n$$
$$\Rightarrow n - 1 = 5$$
$$n = 6$$

6, $20, 10, 5, \frac{5}{2}, \ldots \frac{5}{256}$

តាមរូបមន្ត $u_n = u_1 \times q^{n-1}$

ដោយ $u_n = \frac{5}{256}, u_1 = 20, q = \frac{10}{20} = \frac{1}{2}$

$$\Rightarrow \frac{5}{256} = 20 \times \frac{1}{2}^{n-1}$$
$$\frac{5}{5120} = \frac{1}{2}^{n-1}$$
$$\frac{1}{1024} = \frac{1}{2}^{n-1}$$
$$\frac{1}{2}^{10} = \frac{1}{2}^{n-1}$$
$$\Rightarrow n = 11$$

7, $\sqrt{2}, 2, 2\sqrt{2}, 4, \ldots, 1024$

តាមរូបមន្ត $u_n = u_1 \times q^{n-1}$

ដោយ

$$u_n = 1024, u_1 = \sqrt{2}, q = \frac{2}{\sqrt{2}} = \frac{2\sqrt{2}}{2} = \sqrt{2}$$

$$\Rightarrow 1024 = \sqrt{2} + \sqrt{2}^{n-1}$$
$$512\sqrt{2} = \sqrt{2}^{n-1}$$
$$\sqrt{524288} = \sqrt{2}^{n-1} \quad \backslash$$
$$\sqrt{2}^{19} = \sqrt{2}^{n-1}$$
$$\Rightarrow n = 20$$

8, **បើ** $u_1 = 3 \& q = 5$

តាមរូបមន្ត $u_n = u_1 \times q^{n-1}$

$$\Rightarrow u_n = 3 \times 5^{n-1}$$

ដូចនេះ $\boxed{u_n = 3 \times 5^{n-1}}$

9, **បើ** $u_9 = 256 \& q = -3$

តាមរូបមន្ត $u_n = u_1 \times q^{n-1}$

ដោយ $u_n = u_9 = 256, q = -3$

$\Rightarrow u_9 = u_1 \times q^{n-1}$

$256 = u_1 \times -3^{n-1}$

$u_1 = \frac{256}{-38} = \frac{2^8}{-3^8} = (-\frac{2}{3})^8$

$\Rightarrow u_n = u_1 \times q^{n-1}$

ដោយ $u_1 = (-\frac{2}{3})^8$

$\Rightarrow u_n = (-\frac{2}{3})^8 \times (-3)^{n-1}$

10, **បើ** $u_6 = 8 \& u_{15} = 4096$

តាមរូបមន្ត $u_m = u_p \times q^{m-p}$

$u_n = u_6 \times q^{n-6}$

$\Rightarrow u_{15} = u_6 \times q^{n-1}$

$4096 = 8 \times q^{n-6}$

$\sqrt[9]{q^9} = \sqrt[9]{512}$

$\Rightarrow q = \sqrt[9]{512} = \sqrt[9]{2} = 2$

$\Rightarrow u_n = u_6 \times q^{n-6}$

$= 8 \times 2^{n-6} = 2^3 \times 2^{n-6}$

$= 2^{n-3}$

11, **បើ** $a_o = 5, q = 5$

តាមរូបមន្ត $a_n = a_p \times q^{n-p}$

$\Rightarrow a_n = a_o \times q^{n-0}$

$= a_4 \times 5^n$

$= 5^{n+1}$

12, **បើ** $a_4 = 3, q = \frac{1}{2}$

តាមរូបមន្ត $a_n = a_p \times q^{n-p}$

$\Rightarrow a_n = a_4 \times q^{n-4}$

$= 3 \times (\frac{1}{2})^{n-4}$

13, **ក, គណនាតួទី**8

តាមរូបមន្ត $a_n = a_1 \times q^{n-1}$

ដោយ $a_1 = 2, q = \frac{6}{2} = 3$

$\Rightarrow a_8 = 2 \times 3^{8-1}$

$= 2 \times 3^7$

$= 2 \times 2187$

$= 4374$

ខ, រកចំនួនតួ13122

យើងមាន $a_n = 2 \times 3^{n-1}$

ដោយ $a_n = 13122$

$\Rightarrow 2 \times 3^{n-1} = 13122$

$3^{n-1} = \frac{13122}{2}$

$3^{n-1} = 65$

$3^{n-1} = 3^8$

$n - 1 = 8$

$\Rightarrow n = 8 + 1 = 9$

14, **ក, គណនា** $a_n \& a_{10}$

+រក a_n

តាមរូបមន្ត $a_n = a_1 \times q^{n-1}$

ដោយ $a_1 = 3, q = \frac{12}{3} = 4$

$\Rightarrow a_n = 3 \times 4^{n-1}$

ខ, រកចំនួនតួ12288

យើងមាន $a_n = 3\times 4^{n-1}$

$$a_n = 12288$$

$$\Rightarrow 3\times 4^{n-1} = 12288$$
$$4^{n-1} = \frac{12288}{3}$$
$$4^{n-1} = 4096$$
$$4^{n-1} = 4^6$$
$$n-1 = 6$$
$$\Rightarrow n = 6+1$$
$$n = 7$$

15, **ក**, **គណនា** a_n, a_5, a_3

+ រក a_n

តាមរូបមន្ត $a_n = a_1 \times q^{n-1}$

ដោយ $a_1 = 1, q = \frac{2}{1} = 2$

$$\Rightarrow a_n = 1\times 2^{n-1}$$

+រក a_5

ដោយ $a_n = 1\times 2^{n-1}$

$$\Rightarrow a_5 = 1\times 2^{5-1}$$
$$= 1\times 2^4$$
$$= 16$$

+រក a_3

ដោយ $a_n = 1\times 2^{n-1}$

$$\Rightarrow a_3 = 1\times 2^{3-1}$$
$$= 1\times 2^2$$
$$= 2^2 = 4$$

ខ, **រកចំនួនតួ**2048

ដោយ $a_n = 1\times 2^{n-1}$

$$a_n = 2048$$

$$\Rightarrow 1\times 2^{n-1} = 2048$$
$$2^{n-1} = 2048$$
$$2^{n-1} = 2^{11}$$
$$n-1 = 11$$
$$\Rightarrow n = 11+1 = 12$$

16, **ក**, **គណនា** a_n, a_3, a_7

+ រក a_n

តាមរូបមន្ត $a_n = a_1 \times q^{n-1}$

ដោយ $a_1 = 20, q = \frac{10}{20} = \frac{1}{2}$

$$\Rightarrow a_n = 20\times (\frac{1}{2})^{n-1}$$

+រក a_3

ដោយ $a_n = 20\times (\frac{1}{2})^{n-1}$

$$\Rightarrow a_n = 20\times (\frac{1}{2})^{3-1}$$
$$= 20\times (\frac{1}{2})^2$$
$$= 20\times \frac{1}{4}$$
$$= \frac{20}{4} = 5$$

+រក a_4

ដោយ $a_n = 20\times (\frac{1}{2})^{n-1}$

$$\Rightarrow a_4 = 20\times (\frac{1}{2})^{n-1}$$

$= 20\times(\frac{1}{2})^3$

$= 20\times\frac{1}{8}$

$= \frac{20}{8} = \frac{10}{4} = \frac{5}{2}$

ខ, រកចំនួនតួ $\frac{5}{256}$

ដោយ $a_n = 20\times(\frac{1}{2})^{n-1}$

$a_n = \frac{5}{256}$

$\Rightarrow \frac{5}{256} = 20\times(\frac{1}{2})^{n-1}$

$\frac{5}{256} = (\frac{1}{2})^{n-1}$

$\frac{1}{1024} = (\frac{1}{2})^{n-1}$

$(\frac{1}{2})^{10} = (\frac{1}{2})^{n-1}$

$10 = n-1$

$\Rightarrow n = 11$

17, **គណនាផលបូក** $2+6+18+...+1458$

តាមរូបមន្ត $a_n = a_1\times q^{n-1}$

ដោយ $a_n = 1458, a_1 = 2, q = \frac{6}{2} = 3$

$\Rightarrow 1458 = 2\times 3^{n-1}$

$759 = 3^{n-1}$

$3^6 = 3^{n-1}$

$6 = n-1 \Rightarrow n = 7$

តាមរូបមន្ត $s_n = \frac{a_1(q^n-1)}{q-1}$

ដោយ $s_n = s_7, a_1 = 2, q = 3$

$\Rightarrow s_7 = \frac{2(3^n-1)}{3-1}$

$s_7 = 3^n - 1$

$s_7 = 3^7 - 1 = 2186$

18, **គណនាផលបូក** $24+12+6+...+\frac{3}{8}$

តាមរូបមន្ត $a_n = a_1\times q^{n-1}$

ដោយ $a_n = \frac{3}{8}, a_1 = 24, q = \frac{12}{24} = \frac{1}{2}$

$\Rightarrow \frac{3}{8} = 24\times(\frac{1}{2})^{n-1}$

$(\frac{1}{2})^{n-1}\times 8 = \frac{1}{8}$

$(\frac{1}{2})^{n-1} = \frac{1}{2^3\times 2^3} = \frac{1}{2^6}$

$(\frac{1}{2})^{n-1} = (\frac{1}{2})^{7}$

$n-1 = 7 \Rightarrow n = 8$

+រក s_8

តាមរូបមន្ត $s_n = \frac{a_1(q^n-1)}{q-1}$

ដោយ $s_n = s_8, a_1 = 24, q\frac{12}{24} = \frac{1}{2}$

$\Rightarrow s_8 = \frac{24((\frac{1}{2})^8-1)}{\frac{1}{2}-1}$

$= \frac{24((\frac{1}{2})^8-1)}{-\frac{1}{2}}$

$= -48(\frac{1-2^8}{28})$

$= 48(\frac{2^8-1}{28})$

19, $a_3=10, a_6=640$

រក $q, a_1, a_n, a_{20}, s_{20}$

$a_n = a_1 \times q^{n-1}$

$.a_3 = 10 \Leftrightarrow 10 = a_1 \times q^2 \Leftrightarrow a_1 \times q^2 = 10 \quad (1)$

$.a_6 = 640 \Leftrightarrow 640 = a_1 \times q^5 \Leftrightarrow a_1 \times q^5 640 \quad (2)$

យក(1)ធៀប(2)

$$\frac{a_1 \times q^5}{a_1 \times q^2} = \frac{640}{10}$$
$$q^3 = 64$$
$$\Rightarrow q = \sqrt[3]{4^3} = 4$$

យក $q=4$ **ទៅជួសនឹង**(1)

$$.a_1 \times q^2 = 10$$
$$a_1 \times 4^2 = 10$$
$$a_1 = \frac{10}{16} = \frac{5}{8}$$

. រក a_{20}

$$a_n = a_1 \times q^{n-1}$$
$$a_{20} = \frac{5}{8} \times 4^{20-1}$$
$$= \frac{5}{8} \times 4^{19}$$

$$.s_n = \frac{a_1(q^n-1)}{q-1}$$

. រក s_{20}

$$s_{20} = \frac{\frac{5}{8}(4^{20}-1)}{4-1}$$
$$= \frac{\frac{5}{8}(4^{20}-1)}{3}$$
$$= \frac{5}{24}(4^{20}-1)$$

$$20, s_n = 1+11+111+\ldots+111\ldots111$$
$$9s_n = 9+99+999+\ldots+999\ldots999$$
$$= 10-1+10^2-1+10^3-1+\ldots+10^n-1$$
$$= 10^1+10^2+10^3+\ldots+10^n-(1+1+1+\ldots+1)$$
$$= \frac{10(10^n-1)}{10-1} = \frac{10^{n+1}-10-9n}{9}$$
$$\Rightarrow s_n = \frac{10^{n+1}-9n-10}{81}$$

$$21, s_n = 5+55+555+\ldots+555\ldots555$$
$$\frac{s_n}{5} = 1+11+111+\ldots+111\ldots111$$
$$\frac{9s_n}{5} = 9+99+999+\ldots+999\ldots999$$
$$= 10-1+10^2-1+10^3-1+\ldots+10^n-1$$
$$= 10+10^2+10^3+\ldots.+10^n-(1+1+1+\ldots+1+1)$$
$$= \frac{10(10^n-1)}{10-1} - n = \frac{10^{n+1}-10-9n}{9}$$
$$\Rightarrow s_n = \frac{5\times 10^{n+1}-45n-50}{81}$$

$$22, s_n = \frac{1}{3}+(\frac{1}{3})^2+(\frac{1}{3})^3+\ldots+(\frac{1}{3})^n$$

ក្នុង, $a_1 = \frac{1}{3}, q = \frac{1}{3}$

$$\Rightarrow s_n = \frac{\frac{1}{3}[(\frac{1}{3})^n-1]}{\frac{1}{3}-1}$$
$$= \frac{\frac{1}{3}[(\frac{1}{3})^n-1]}{-\frac{2}{3}}$$
$$= \frac{(\frac{1}{3})^n-1}{-2} = \frac{1-(\frac{1}{3})^n}{2}$$

$$22, s_n = \frac{1}{4}+\frac{2}{4}+\frac{2^2}{4}+\frac{2^3}{4}+\ldots+\frac{2^{n-1}}{4}$$
$$s_n = \frac{1}{4}(1+2+2^2+2^3+..+2^{n-1}$$
$$4s_n = 1+2+2^2+2^3+\ldots+2^{n-1}$$
$$= \frac{1(2^n-1)}{2-1} - 2^{n-1}$$
$$\Rightarrow s_n = \frac{2^{n-1}}{4}$$

23, **គណនាផលបូក អន្តរតួរ**

$$s=6+2+\frac{2}{3}+\frac{2}{9}+\ldots$$

$$s_\infty=\frac{6}{1-\frac{1}{3}=\frac{6}{3}=\frac{18}{2}=9}$$
$$\Rightarrow s_\infty=9$$

$$24, a_1=3, s_3=21,$$

រក q, a_n, a_7, s_7

$$.s_3=21, s_n=\frac{a_1(q^n-1)}{q-1}$$
$$s_3=\frac{a_1(q^3-1)}{q-1}$$
$$q^2+q+1=7$$
$$q^2+q-6=0$$
$$\Delta=b^2-4ac=(1)^2-4\times1\times(-6)$$
$$=1+24+25$$
$$\sqrt{\Delta}=\sqrt{25}=5$$
$$.\ q_1=\frac{-b+\sqrt{\Delta}}{2a}=\frac{-1+5}{2\times1}=\frac{4}{2}=2$$
$$.\ q_3=\frac{-b-\sqrt{\Delta}}{2a}=\frac{-1+5}{21}=\frac{-6}{2}=-3$$

+ករណី $q=2$

$$\Rightarrow a_n=a_1\times q^{n-1}$$
$$a_n=3\times q^{n-1}$$
$$\Rightarrow a_7=3\times2^{7-1}$$
$$=3\times2^6$$
$$.\ s_n=\frac{a_1(q^n-1)}{q-1}\Rightarrow s_7=\frac{3(2^7-1)}{2-1}=3(2^7-1)$$

VIII.ផលបូកស្ទីត

$$1.s=1+2+3+\ldots+20, n=20$$
$$s=\frac{20(20+1)}{2}=10\times21=210$$

$$2, s=1^2+2^2+3^2+\ldots+30^2, n=30$$
$$s=\frac{30(30+1)(2\times30+1)}{6}$$
$$=5\times31\times61=9455$$

$$3, s=11+12+13+\ldots+20$$
$$s=1+2+3+\ldots+20-(1+2+3+\ldots+10)$$
$$=\frac{20(20+1)}{2}-\frac{10(10+1)}{2}$$
$$=10\times21-5\times11=210-55=155$$

$$4.s_n=\frac{1}{1\times5}+\frac{1}{5\times9}+\frac{1}{9\times13}+\ldots+\frac{1}{(4n-3)(4n+1)}$$
$$d=4$$
$$\frac{1}{(4k-3)(4k+1)}=\frac{1}{4}(\frac{1}{4k-3}-\frac{1}{4k+1})$$
$$.k=1,\frac{1}{1\times5}=\frac{1}{4}(1-\frac{1}{5})$$
$$.k=2,\frac{1}{5\times9}=\frac{1}{4}(\frac{1}{5}-\frac{1}{9})$$
$$.k=3,\frac{1}{9\times13}=\frac{1}{4}(\frac{1}{9}-\frac{1}{13})$$
$$\vdots$$
$$.k=n,\frac{1}{(4n-3)(4n+1)}=\frac{1}{4}(\frac{1}{4n-3}-\frac{1}{4n+1})$$
$$\Rightarrow s_n=\frac{1}{4}(1-\frac{1}{4n+1})$$
$$=\frac{1}{4}(\frac{4n+1-1}{4n+1})$$
$$=\frac{1}{4}\times\frac{4n}{4n+1}$$
$$\Rightarrow s_n=\frac{n}{4n+1}$$

$$5, s_n=1\cdot3+2\cdot9+3\cdot27+\ldots+n\cdot3^n$$
$$=1\cdot3+2\cdot3^2+3\cdot3^3+\ldots+(n-1)3^{n-1}+n\cdot3^n$$
$$3s_n=1\cdot3^2+2\cdot3^3+\ldots+(n-1)3^n+n\cdot3^{n+1}$$
$$-2sn=3+3^2+3^3+\ldots+3^n-n\cdot3^{n+1}$$
$$=\frac{a_1(q^n-1)}{q-1}-n\cdot3^{n+1}$$
$$=\frac{3(3^n-1)}{3-1}-n\cdot3^{n+1}$$
$$=\frac{3^{n+1}-3}{2}-n\cdot3^{n+1}$$

$$= \frac{3^{n+1} - 3 - 2n \cdot 3^{n+1}}{2}$$

$$\Rightarrow s_n = \frac{2n \cdot 3^{n+1} - 3^{n+1} + 3}{2}$$

$$6, s_n = 3 \cdot 3 + 4 \cdot 9 + 5 \cdot 27 + \ldots + (n+2)3^n$$
$$= 3 \cdot 3 + 4 \cdot 3^2 + 5 \cdot 3^3 + \ldots + (n+1)3^{n-1} + (n+2)3^n$$
$$3s_n = 3 \cdot 3^2 + 4 \cdot 3^3 + \ldots + (n+1)3^n + (n+2)3^{n+1}$$
$$-2sn = 3 \cdot 3 + 3^2 + 3^3 + \ldots + 3^n - n \cdot 3^{n+1}$$
$$= 2 \cdot 3 + \frac{3(3^n - 1)}{3-1} - (n+2)3^{n+1}$$
$$= 6 + \frac{3^{n+1} - 3}{2} - (n+2)3^{n+1}$$
$$= \frac{3^{n+1} - 3 - (2n+4)3^{n+1} + 12}{2}$$
$$\Rightarrow s_n \frac{(2n+3)3^{n+1} - 9}{4}$$

$7, (a_n) : 3, 5, 9, 15, 23, \ldots$
$(b_n) : 2, 4, 6, 8, \ldots$

(b_n) ជាស្ទីតនព្វន្ត $b_1 = 2, d = 2$

$$b_n = b_1 + (n-1)d = 2 + (n-1)2$$
$$= 2 + 2n - 2 = 2n$$
$$\Rightarrow a_n = a_1 + \sum_{k=1}^{n-1} b_k$$
$$= 3 + \sum_{k=1}^{n-1} 2k$$
$$a_n = 3 + \frac{2n(n-1)}{2} = 3 + n^2 - n = n^2 - n + 3$$

$8, (a_n) : 3, 4, 7, 12, 19, \ldots$
$(b_n) : 1, 3, 5, 7, \ldots$

(b_n) ជាស្ទីតនព្វន្ត $b_1 = 1, d = 2$

$$b_n = b_1 + (n-1)d = 1 + (n-1)2$$
$$= 1 + 2n - 2 = 2n - 1$$
$$\Rightarrow a_n = a_1 + \sum_{k=1}^{n-1} b_k$$
$$= 3 + \sum_{k=1}^{n-1} 2k - 1$$

$$a_n = 3 + \frac{2n(n-1)}{2} - (n-1) = 3 + n^2 - n + 1 - n$$
$$= n^2 - 2n + 4$$

$9, a_1 = 7, a_{n+1} = 2a_1 + 3$

សមីការសំគាល់ $r = 2r + 3 \Rightarrow r = -3$

តាងស្ទីតជំនួយ $v_n = a_n - r \Rightarrow v_n = a_n + 3$

$$\Rightarrow v_{n+1} = a_{n+1} + 3 = 2a_n + 3 + 3$$
$$= 2a_n + 6$$
$$= 2(a_n + 3)$$
$$= 2v_n$$ **ជាស្ទីតធរណីមាត្រ**

ដោយ $q = 2, v_1 = a_1 + 3 = 7 + 3 = 10$

$$\Rightarrow v_n = 10 \times 2^{n-1}$$
$$\Rightarrow 10 \times 2^{n-1} = a_n + 3$$
$$\Rightarrow a_n = 10 \times 2^{n-1} - 3$$

$10, a_1 = 2, a_n = 3a_1 - 2$

សមីការសំគាល់ $r = 3r - 2 \Rightarrow r = 1$

តាងស្ទីតជំនួយ $v_n = a_n - r \Rightarrow v_n = a_n - 1$

$$\Rightarrow v_{n+1} = a_{n+1} + 1 = 3a_n - 2 - 1$$
$$= 3a_n - 3$$
$$= 3(a_n - 1)$$
$$= 2v_n$$ **ជាស្ទីតធរណីមាត្រ**

ដោយ $q = 3, v_1 = a_1 + 3 = 7 + 3 = 10$

$$\Rightarrow v_n = 1 \times 3^{n-1}$$
$$\Rightarrow 3^{n-1} = a_n - 1$$
$$\Rightarrow a_n = 3^{n-1} + 1$$