

Bansan dan Deret

Anitmanika

Geometri

berhingga  
tak hingga

## Bansan

Bilangan Genap : 2, 4, 6, 8, ...,  $2n$

$$\text{angka - 1} = \text{suku ke-1}$$

$$\text{angka - n} = \text{suku ke-n}$$

$$\text{suku ke-n} = u_n$$

$$u_1 = 2, u_2 = 4, u_3 = 6, \dots$$

$$1 = 2 \times 2$$

$$2 = 2 \times 2$$

$$3 = 2 \times 3$$

$$\dots$$

$$n = 2^n \rightarrow \text{rumus pola bilangan surku ke } n$$

1, 4, 7, 10, 13, ...

$$2 \times 1 + (-1)$$

$$y_1 = 2 \times 2 + 0$$

$$y_2 = 2 \times 3 + 1$$

$$y_3 = 2 \times 4 + 2$$

$$y_1 = 2 \times 1 + (-1) = 1$$

$$y_2 = 2 \times 2 + 0 = 4$$

$$y_3 = 2 \times 3 + 1 = 7$$

$$y_9 = 2 \times 9 + 2$$

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$$y_n =$$

$$y_9 = 2 \times 9 + 2$$

$$\begin{aligned} u_1 &= \underline{2 \times 1} + \underline{1 - 2} \\ u_2 &= \underline{2 \times 2} + \underline{2 - 2} \\ u_3 &= \underline{2 \times 3} + \underline{3 - 2} \\ u_4 &= \underline{2 \times 4} + \underline{4 - 2} \\ u_n &= 2n + n - 2 \\ &= 3n - 2 \end{aligned}$$

$$1, u_2 = 4, u_3 = 7, u_4 = 10, u_5 = 13, \dots, u_n = 19$$

$+3$        $+3$        $+3$        $\times 3$        $+3$

$$u_2 - u_1 = 4 - 1 = 3$$

Terap

$$u_3 - u_2 = 7 - 4 = 3$$

23. aritmatika

$$u_4 - u_3 = 10 - 7 = 3$$

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$$u_n - u_{n-1} = 3 \rightarrow \text{senilai tiap suku} = \text{beda}$$

(b)

$$u_1 = a = 1$$

## \* Barisan Aritmatika

Barisan yang sebesar antar sukunya / b  
terdiri

$$2, 9, 16, 23, 30, \dots \text{ (aritmatika)}$$

$+7 \quad +7 \quad +7 \quad +7 \quad +7$

$$3, 8, 13, 18, \dots \text{ (aritmatika)}$$

$+5 \quad +5 \quad +5 \quad +5$

$$b = u_2 - u_1 = u_3 - u_2 = u_4 - u_3$$

$$b = u_n - u_{n-1}$$

$$U_2 \quad U_2 \quad U_3 \quad U_4$$

$$7, 12, 18, 25, \dots$$

$+5$        $+6$        $+7$

(bukan Aritmatika)  
karena  $b$  berubah

- Syarat bansen Aritmatika

1) sejumlah aritur  $\Delta u = \frac{b}{n} = \text{tetap}$

2)  $b = U_2 - U_1 = U_3 - U_2 = U_4 - U_3 = \dots =$

$U_n - U_{n-1}$

tidak memenuhi

$b = 5 \neq 6 \neq 7 \neq \dots \dots \text{(salah)}$

$$u_1 \quad u_2 \quad u_3 \quad u_4$$

$$1, 7, 13, 19, \dots$$

$$u_n = \dots ?$$

$$\begin{aligned} a &= u_1 = 1 \\ b &= 6 \end{aligned}$$

$$u_n = a + (n-1)b \quad (\text{caraikibu})$$

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

$$u_n = 6n - 5 \quad (\checkmark)$$

$$\begin{aligned} u_2 &= 6 \cdot 1 - 5 \\ &= 1 \end{aligned}$$

$$\begin{aligned} u_2 &= 6 \cdot 2 - 5 \\ &= 7 \end{aligned}$$

$$\begin{aligned} u_3 &= 6 \cdot 3 - 5 \\ &= 13 \end{aligned}$$

3, 7, 11, 15, ...

$U_n = ?$

$$\begin{aligned} U_n &= 3 + (n-2) \cdot 4 \\ &= 3 + 4n - 4 \\ U_n &= 4n - 1 \end{aligned}$$

$U_{100} = ?$

$$\begin{aligned} U_{100} &= 400 - 1 \\ &= \underline{\underline{399}} \end{aligned}$$

3, 7, 11, 15, 19, 23, 27, 31, 35, ...,  
 $\downarrow 4 \quad \downarrow 4 \quad \downarrow 4 \quad \downarrow 4$

$$a, \underbrace{a+1}_{+1}, \underbrace{a+2}_{+1}, a+3, \dots$$

$$b = 1$$

$$u_{100} = \dots ?$$

$$\begin{aligned} u_{100} &= a + (100 - 1) \\ &= \underline{\underline{a + 99}} \end{aligned}$$

$$\underline{\underline{u_7 = 13}} \quad , \quad \underline{\underline{b = 2}} \quad , \quad \underline{\underline{u_{200} = ?}} \quad , \quad \underline{\underline{a = 1}}$$

$$U_7 = 13, \quad b = 2$$

$$\begin{aligned} U_7 &= a + (7-1)b \\ &= a + 6 \cdot 2 \\ &= a + 12 \end{aligned}$$

$$a + 12 = 13$$

$$\underline{a = 1}$$

$$U_n = a + (n-1)b$$

$$\begin{aligned} U_{200} &= 1 + (199)2 \\ &= 1 + 398 \\ &= 399 \end{aligned}$$

$$U_1 = 1$$

1, 3, 5, 7, ...

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

$$= 1 + 2n - 2$$

=  $2n - 1 \rightarrow$  bilangan apa ? ganjil

$$U_n = a + (n-1) b \quad \rightarrow \quad b = U_{16} - U_{15} \\ = 33 - 31 \\ = 2$$

$$b = U_n - U_{n-1}$$

$$U_n = a + (n-1) U_{n-1}$$

$$U_7 = 15 , \quad U_{15} = 31 , \quad U_{16} = 33$$

$$U_{100} = \dots ? \quad b = \dots ? \\ = 2$$

$$a = 3$$

$$y_2 = 15$$

$$y_2 = a + b \cdot 2$$

$$15 = a + 6 \cdot 2$$

$$15 = a + 12$$

$$\begin{aligned} a &= 15 - 12 \\ &= 3 \end{aligned}$$

$$b = 2$$

$$y_{100} = a + 99b$$

$$= 3 + 99 \cdot 2$$

$$= 3 + 198$$

$$= 201$$

## Deret Aritmatika

$$U_{100} ?$$

$S_{100} ? = 100$  suku pertama

$b = \text{Tetap}$

$$S_n = \frac{n}{2} (a + U_n)$$

$$\begin{array}{ccccccccc} 2 & , & 4 & , & 6 & , & 8 & , & \dots \\ \underbrace{+2}_{+2} & & \underbrace{+2}_{+2} & & \underbrace{+2}_{+2} & & & & \\ & & & & & & b = 2 & & \end{array}$$

$$\begin{aligned} & 10 \cancel{(6 + 19b)}^x \\ & = -60 + \cancel{19b}^x \\ & = \underline{\underline{60 + 190b}} \end{aligned}$$

$$f = S_3$$

1, 5, 9, 13, 17, 21, 25

Tentukan hasil jumlah 3 suku pertama

$$\rightarrow S_3 = 1 + 5 + 9 \\ = 15$$

$$S_5 = 1 + 5 + 9 + 13 + 17 \\ = 45 \checkmark$$

$$S_{100} = \frac{100}{2} \times 398 \\ = \underline{\underline{19900}}$$

Rumus D. Aritmatika

$$S_{100} = \dots ?$$

$$U_n = a + b(n-1) \\ = 1 + 4(n-1) \\ = 1 + 4n - 4 \\ = 4n - 3 \rightarrow 4 \cdot 100 - 3 = 397$$

$$S_n = \frac{n}{2} (a + U_n)$$

$$S_{100} = \frac{100}{2} (1 + 397) \\ = 50 (398)$$

Diketahui Jumlah 20 suku pertama suatu barisan aritmetika adalah 1390. Jika suku pertama dari barisan tersebut adalah 3, selisih dari dua suku berurutan di barisan tersebut adalah... (OSK 2019 Math SMP)

$$1, 1, 7, 10$$

seusinya = b

$$u_n - u_{n-1} = b$$

$$S_n = \frac{n}{2} (a + u_n)$$

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

$$S_n = \frac{n}{2} (2a + b(n-1))$$

$$b = \dots ?$$

$$S_{20} = 1390$$

$$a = 3$$

$$b = \dots ?$$

$$S_{20} = \frac{20}{2} (2 \cdot 3 + b(20-1))$$

$$S_{20} = 10 (6 + 19b)$$

$$1390 = 10 (6 + 19b)$$

$$139 = 6 + 19b$$

$$19b = 139 - 6$$

$$b = 133 / 19 = 7$$

Misalkan  $U_n$  dan  $S_n$  masing-masing menyatakan suku ke- $n$  dan jumlah  $n$  suku pertama suatu barisan. Jika  $S_n = \frac{n^2 - n}{2^n}$ , maka  $U_2 - U_4 + U_6 = \dots$

- (A)  $\frac{6}{32}$
- (B)  $\frac{11}{32}$
- (C)  $\frac{1}{2}$
- (D)  $\frac{21}{32}$

(OSK 2018 Math SMP)

$$\begin{array}{r} 1390 = 10 (6 + 1g b) \\ \hline 1390 = 6 + 1g b \end{array}$$

Perhatikan barisan bilangan berikut.

1, 2, 4, 8, 15, 26, ?, ?, ?, ...

Tiga bilangan selanjutnya berturut-turut adalah...

- (A) 37, 49, 71
- (B) 37, 61, 99
- (C) 42, 58, 74
- (D) 42, 64, 93

(OSK 2020 Math SMP)

$$\begin{array}{cccccccccc} 1 & , & 2 & , & 4 & , & 8 & , & 15 & , & 26 & , & 42 & , & 64 \\ \underbrace{+1}_{+1} & \underbrace{+2}_{+2} & \underbrace{+4}_{+3} & \underbrace{+8}_{+7} & \underbrace{+15}_{+11} & \underbrace{+26}_{+16} & \underbrace{+42}_{+5} & \underbrace{+64}_{+6} & & & & & & & \\ & & & & & & & & & & & & & & \end{array}$$

ans = D

Misalkan B menyatakan barisan bilangan bulat yang suku-sukunya  $b_1, b_2, b_3, b_4, \dots$  dan  $f(B)$  menyatakan barisan bilangan bulat yang suku-sukunya  $b_1 - b_2, b_2 - b_3, b_3 - b_4, \dots$ . Jika semua suku dari barisan  $f(f(B))$  adalah bilangan bulat  $c$ , dengan  $c = 3$ , dan diketahui  $b_{21} \times b_{42} = b_{21} + b_{42} = 0$ , maka nilai dari  $b_2$  adalah....

- A. 90
- B. 760
- C. 1140
- D. 1230

(OSK 2021 Math SMP HARD)



Misalkan B menyatakan barisan bilangan bulat yang suku-sukunya  $b_1, b_2, b_3, b_4, \dots$  dan  $f(B)$  menyatakan barisan bilangan bulat yang suku-sukunya  $b_1 - b_2, b_2 - b_3, b_3 - b_4, \dots$ . Jika semua suku dari barisan  $f(f(B))$  adalah bilangan bulat  $c$ , dengan  $c = 3$ , dan diketahui  $b_{21} \times b_{42} = b_{21} + b_{42} = 0$ , maka nilai dari  $b_2$  adalah....

- A. 90
- B. 760
- C. 1140
- D. 1230

(OSK 2021 Math SMP HARD)

Diketahui suatu barisan aritmetika  $a_1, a_2, a_3, \dots$  dengan semua sukunya bilangan bulat,  $a_1$  habis dibagi 3,  $a_2$  habis dibagi 5, dan  $a_3$  habis dibagi 7. Jika  $a_1 + a_2 + a_3 = 405$  dan  $a_1 > 105$ , maka nilai  $k$  terkecil sedemikian  $a_k > 1000$  adalah....

- A. 74
- B. 75
- C. 76
- D. 77

(OSK 2022 Math SMP HARD)

. Diketahui barisan bilangan bulat  $x_1, x_2, \dots, x_{2023}$  yang memenuhi tiga syarat berikut

$$x_1 + x_3 + \dots + x_{2023} = 25 - (x_2 + x_4 + \dots + x_{2022})$$

$$x_1^2 + x_3^2 + \dots + x_{2023}^2 = 125 - (x_2^2 + x_4^2 + \dots + x_{2022}^2)$$

$$-2 \leq x_i \leq 1, \text{ untuk } i = 1, 2, 3, \dots, 2023$$

Nilai terkecil yang mungkin untuk  $x_1^3 + x_2^3 + \dots + x_{2023}^3$  adalah...

- A. -100
- B. -71
- C. -51
- D. -16

(OSK 2023 Math SMP VERY HARD)

