

⑤

$12 + 4 \times 3$

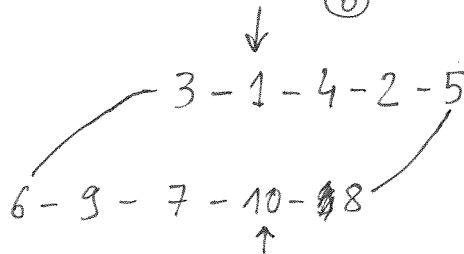
- 1x3
- 2x3
- 3x3
- 4x3 + x

x: 1, 2, 3...12, 1, 2, 3...12

$$24 + 2 \sum_{x=1}^{12} (30 + x) = 24 + 2 \times 30 \times 12 + 2 \times \frac{12 \times 13}{2}$$

$$= 24 + 720 + 156 = \boxed{300}$$

⑥



⑦

D<sub>4</sub> - L - Ma  
↑  
8

Ma: 8

$L: 4 \times 10 + 8 = 48$

$D: 24 \times 10 + 8 = \boxed{248}$

⑧

$$15 + 9 + 12 \quad \overbrace{6-1} + \overbrace{6-2} + \overbrace{6-3} + \overbrace{6-?} + 6$$

$12^* 45^* 78^* 10.11^* 13.14 \text{ or } 14.15$

$1 \quad 4 \quad 7 \quad 10 \quad 13 \quad 15$

$12 \quad 45 \quad 78 \quad 10.11 \quad 13 \quad 15$

$4 + 8 + 12 + xxx$

~~1 3 5 7 9 11~~

~~1 2 3 4 5 6 7 8 9 10 11 12 13~~

1: 1 3 5 7 9 11

2: 1 2 3 5 6 7 9 10 11 13 14

3: 1 2 3 5 6 7 9 10 11 13 14 15

4: OK

(9)

576	212	211
	211	213
574	213	212
	⋮	
<del>340</del>	330	329
339	<del>329</del>	331
338	331	330
337	330	332
336	332	331

578 + 423 = 999

335	331	333	
334	333	332	→ 4
333	<del>332</del>	334	

576 → 334 = 242

*or*

+2 ≡ -1 [3] → typ 0,1,2 [3]

(10)

from formula  $f \geq 4$

4S ≡ S [9] → S ≡ 0 [3]

<del>0</del>	<del>2</del>	<del>5</del>	<del>6</del>	4
x				4
<del>0</del>	<del>2</del>	<del>5</del>	6	

	1	0	2	5	6	4
x						4
	4	1	0	2	5	6

		8	2	0	5
x					4
		2	8	2	0

1	5	3	8	4	6
x				4	
6	1	5	3	8	4

		9	4	8	7
x					4
		7	9	4	8

		0	5	1	2	8
x						4
		2	0	5	1	2

		2	3	0	7	6	9
x							4
		9	2	3	0	7	6

3 sol<sup>n</sup> : 102564, 153846, 230769

(11)

$\mu_1 \mu_2 \mu_3 \dots$

$$2\mu_n + \mu_{n+1} = 80$$

$$\mu_1 > 21, \mu_1 \leq 39$$

~~$\mu_1 = 38$~~   $2 \times 20 + 40$

21, 38, 4, 72

22, 36, 8, 64

23, 34, 12, 56

24, 32, 16, 48

25, 30, 20, 40

26, 28, 24, 32, 16, 48

27, 26, ...

→ 27, 26, 28, 24, 32, 16, 48

29, 22, ...

31, 18, ...

(12)

243  
729

1, 2, ~~3, 4, 8, 16~~

3, 6, 9, 18, 27, 54, 81, ...

3, 5, 10, 15, ~~20~~<sup>30</sup>, 45, 90, 135 ...

3, 5, 10, 15, 25, 50, 75, 150 non

$$\mu_{10} = 1, \mu_9 = 3, \mu_5 = 9, \mu_7 = 27 \dots \mu_{15} = 3^7$$

$$\mu_{14} = 2\mu_{13} = 2 \cdot 3^6$$

$$\mu_{16} = 2 \cdot 3^6 + 3^7 = 5 \cdot 3^6 = 5 \times 729 = \boxed{3645}$$

$\mu_{16}:$  4 6 8 10 12 14 16

5 15 45 135 405 1215 3645

(13)

$x, x+20, x+40, \dots, x+20(n-1)$  (max: 180°)  $n \leq 9$   $3 \rightarrow 180$   
 $4 \rightarrow 360$   
 $\vdots$

$$nx + 20 \frac{n(n-1)}{2} = 180(n-2)$$

$$x = 180 \frac{n-2}{n} - 10(n-1)$$

$n=9 \rightarrow x = 80 \times 11 - 10 \times 8 = 220 - 80 = 140$   $n \leq 9$

$$x = 180 \frac{n-2}{n} - 10(n-1)$$

$$= 180 - 10 \left( \frac{36}{n} + n \right)$$

$$= 180 - 150 = 40$$

3: 40-60-80

4: 60-80-100-120

5:

6: 70-90-110-130-150-170

$\rightarrow n=3$

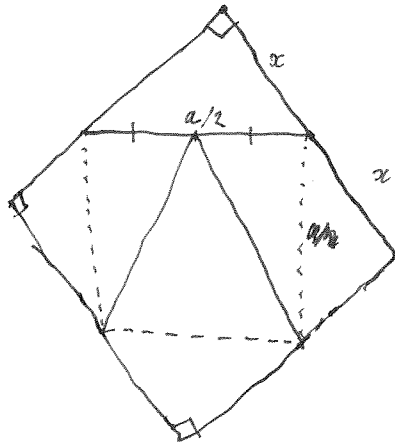
4 sol<sup>o</sup> at 40 et 60

70

(14)

a

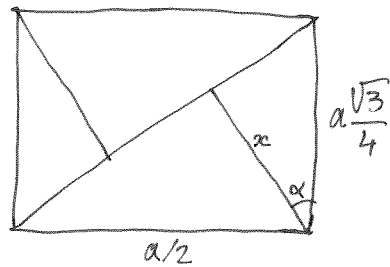
1)  $732 \times 7$   
 $= 12,124$   
 $\div 16 = 2,021$   
 $12,124 / 12$   
 $= 1,010$



$$\frac{a}{2} \times \frac{a\sqrt{3}}{4}$$

$$L = \frac{a\sqrt{7}}{4}$$

$$l =$$



$$R = \frac{\sqrt{3}}{2}$$

$$L^2 = a^2 \left( \frac{1}{4} + \frac{3}{16} \right) = \frac{7a^2}{16}$$

CE

$$l = 2x$$

$$x = \frac{a\sqrt{3}}{4} \cos \alpha$$

$$L = \frac{a^2\sqrt{3}}{8}$$

$$\frac{L}{l} = \frac{L^2}{Ll} = \frac{17a^2}{2 \cdot 16} \frac{8}{a^2\sqrt{3}} = \frac{7}{4\sqrt{3}}$$

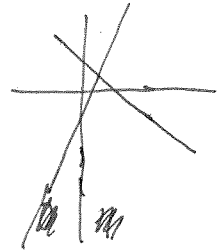
$$= \frac{7\sqrt{3}}{12}$$

(15)

NB: NB: 1 2 4 8 15 26 42 64 93 130

1 2 4 7 11 16 22 29 37

1 2 3 4 5 6 7 8



B: -1

1	2	3	4	5	6	7	8	9	11
0	0	0	1	4	10	20	35	56	
0	0	1	3	6	10	15	21		
0	1	2	3	4	5	6			
1	1	1	1						

1	2	4	7	11
1	2	3	4	
0	0	1	3	6
0	1	2	3	
1	1	1	1	

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

$$1 + 11 + 55 + 165 = 232$$

$$-1 + 11 - \frac{11 \times 10}{2} + 165 = 120$$

7	8	9	10	11
64	93	130	176	232
29	37	46	56	
8	9	10		

7	8	9	10	11	
20	35	56	84	120	
10	105	21	28	36	45
5	6	7	8	9	

⑩

$$5 \times 8 = 4 \times 10$$

$$\begin{aligned} \text{R14 R15} \quad (10-r)^2 &= x^2 + \left(\frac{13}{2}\right)^2 \\ r^2 &= x^2 + \left(\frac{3}{2}\right)^2 \end{aligned} \quad \ominus$$

$$100 - 20r = \left(\frac{13}{2}\right)^2 - \left(\frac{3}{2}\right)^2 = \frac{160}{4} = 40$$

$$20r = 60 \quad \underline{r=3}$$

$$\text{R14} \quad \sin \beta = \left(\frac{3}{2}\right) / 3 = \frac{1}{2}$$

$$\rightarrow \beta = 30^\circ$$

angle au centre :  $60^\circ$

$$L = 2\pi \times 10 / 6 = \frac{10\pi}{3} = \frac{31,416}{3}$$

$$\boxed{10,472} \text{ cm}$$