

2016

I, J

$ABCD A_1 B_1 C_1 D_1$

1000cm^3 . $E, F, G, H,$
 $BC, CD, DD_1, D_1 A_1, A_1 B_1, B_1 B$.

E, F, G, H, I, J

$AEFGHIJ$.

1.

E, F, G, H, I, J

2.

$AEFGHIJ$.

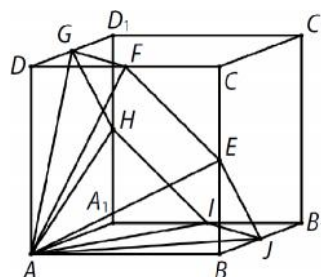
3.

$AEFGHIJ$

AJ
 $C_1 J$

$AE, AF, AG, AH, AI,$
 $C_1 E, C_1 F, C_1 G, C_1 H, C_1 I,$

E, F, G, H, I, J
 $A C_1,$



AC_1

$AC_1,$

()

T

AC_1

S

$AST C_1 ST$

$\overline{AS} = \overline{C_1 S}$, (

S

$AC_1), ST$

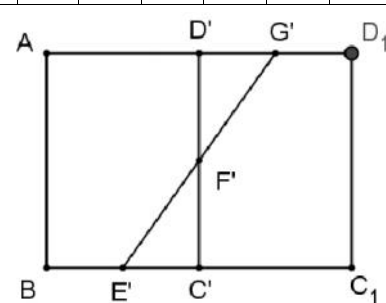
S

$\overline{AT} = \overline{C_1T}$.
 AC_1 , AP
 C_1P
 AP Q . $\overline{AQ} = \overline{C_1Q}$ (
 Q) $\overline{AP} = \overline{AQ} + \overline{QP} = \overline{C_1Q} + \overline{QP} > \overline{C_1P}$ (
) , $\overline{AP} \neq \overline{C_1P}$,
 EF BCD ,
 $EF \parallel BD$. $HI \parallel B_1D_1$. $BD \parallel B_1D_1$, $EF \parallel HI$.
 $FG \parallel IJ$ $GH \parallel JE$. HE
 BCD_1A_1 $HE \parallel CD_1$, $HE \parallel FG$.
 $HE \parallel FG$ H, E, F G
 $GH \parallel EF$, $GH \parallel JE$
 J $EF \parallel HI$ I .
 E, F, G, H, I, J .
 $HE \parallel FG$ $HE \parallel IJ$. $HE \parallel FG$ H, E, F
 G $EF \parallel HI$, . .
 E, F, H I .
 E, F, G, H, I .
 J .

ABC_1D_1 .

	A	B	C	D	A ₁	B ₁	C ₁	D ₁	E	F	G	H	I	J
	A	B	C'	D'	D'	C'	C ₁	D ₁	E'	F'	G'	G'	F'	E'

C B_1 ,
 D A_1 ,
 F G ,
 I ,
 E, F, G'



E, F, G, H, I, J ..
 $BC_1 \cdot AB$, CB_1 -
 $BC_1 \cdot AB$ BCC_1B_1 ,
 $BC_1 \cdot AD_1$ AB -
 BCC_1B_1 , $CB_1 \cdot CB_1$
 ABC_1D_1 , $CB_1 \cdot (C B_1)$ -
 $EJ \parallel CB_1$ EJ
 ABC_1D_1 , $E J$ -
 E, F, G, H, I, J ,
 $\overline{BE'} = \overline{E'C'}$,
 $\overline{C'F'} = \overline{F'D'}$ $\overline{D'G'} = \overline{G'D_1}$ $\overline{AD_1} = \overline{BC_1}$ (-
 $) D' C'$ $AD_1 BC_1$ $\overline{E'C'} = \overline{D'G'}$. -
 $D'C'$ $AD_1 BC_1$
 $G'D'F'$ $\angle E'C'F' = \angle G'F'D'$, . . . $E', F' G'$
 E, F, G, H, I, J -
 EF, FG, GH, HI, IJ JE -
 $\frac{a\sqrt{2}}{2}$ EG, FH, GI, HJ, IE JF -
 $\frac{1}{2}\sqrt{6}$, ED
 ECD , $a \frac{1}{2}$, $ED = \sqrt{a^2 + (\frac{1}{2})^2} = \frac{1}{2}\sqrt{5}$.
 GD ABC ,
 ED , , EDG
 $EG = \sqrt{(\frac{\sqrt{5}}{2})^2 + (\frac{1}{2})^2} = \frac{1}{2}\sqrt{6}$. -
 EFG $\overline{EF} : \overline{FG} : \overline{EG} = \frac{1}{2}\sqrt{2} : \frac{1}{2}\sqrt{2} : \frac{1}{2}\sqrt{6} = 1 : 1 : \sqrt{3}$,
 EFG 120° F .

$FGH, GHI, HIJ, IJE \quad JEF, \quad EFGHIJE$

120° .

$EFGHIJ$

E, F, G, H, I, J

720° ,

$n -$

$S_n = (n - 2) \cdot 180^\circ$.

1.

$(n - 2) \cdot 180^\circ$.

$A_1 A_2 A_3 \dots A_n$

$n -$

$B_1 B_2 B_3 \dots B_n$

$n -$

$A_1 A_2 A_3 \dots A_n$

$A_1 A_k$

$k < n, \dots$

$A_1 A_2 A_3 \dots A_k$

$B_1 B_2 B_3 \dots B_k$,

$A_k A_{k+1} A_{k+2} \dots A_n A_1$

$B_k B_{k+1} B_{k+2} \dots B_n B_1$

$B_2, B_3, \dots B_{k-1}$,

$B_{k+1}, B_{k+2}, \dots, B_n$

$A_1 A_2 A_3 \dots A_n$.

1, $\dots \angle A_2 A_1 A_n$

$\angle A_2 A_1 A_k$

$\angle A_k A_1 A_n$

$\angle B_2 B_1 B_k + \angle B_k B_1 B_n$.

$\angle B_2 B_1 B_n$

1,

EF

AB

K .

IJ

AB

L (

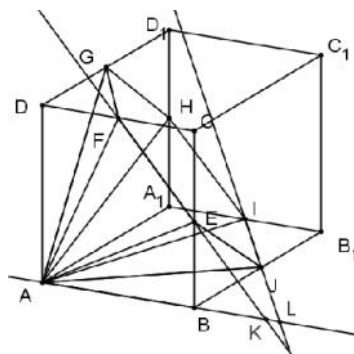
).

:

$\angle FCE = \angle EBK = 90^\circ$,

$\angle CEF = \angle BEK$ ()

$\overline{CE} = \overline{EB}$ (E BC)



$\overline{BK} = \overline{FC} = \frac{1}{2}$. $\overline{BL} = \overline{IJ} = \frac{1}{2}$, ...
 $\overline{BK} = \overline{BL}$, $K \equiv L$. EF IJ
 AB . AD , EF GH
 AA_1 , IJ GH
 , ...
 AB_1C_1D
 FG ,
 CDD_1 , FG
 FG AC_1
 AC_1 FG, GH, HI, IJ JE
 AC_1 E ,
 F J , G, H I , ...
 E, F, G, H, I, J
 ,
 , A $(0,0,0)$, B x -
 $(1,0,0)$, A_1 z - $(0,0,1)$,
 D y - $(0,1,0)$.
 E, F, G, H, I, J :

	E	F	G	H	I	J
x	1	0,5	0	0	0,5	1
y	0,5	1	1	0,5	0	0
z	0	0	0,5	1	1	0,5

$$x + y + z = 1,5,$$

$$\vec{a} = \overline{AB}, \vec{b} = \overline{AA_1}, \vec{c} = \overline{AD}$$

:

$$\overline{AE} = \overline{AB} + \overline{BE} = \overline{AB} + \frac{1}{2}\overline{AD} = \vec{a} + \frac{1}{2}\vec{c}$$

$$\overline{AF} = \overline{AD} + \overline{DF} = \overline{AD} + \frac{1}{2}\overline{AB} = \vec{c} + \frac{1}{2}\vec{a}$$

$$\overline{AG} = \overline{AD} + \overline{DG} = \overline{AD} + \frac{1}{2}\overline{AA_1} = \vec{c} + \frac{1}{2}\vec{b}$$

$$\overline{AH} = \overline{AA_1} + \overline{A_1H} = \overline{AA_1} + \frac{1}{2}\overline{AD} = \vec{b} + \frac{1}{2}\vec{c}$$

$$\overline{AI} = \overline{AA_1} + \overline{A_1I} = \overline{AA_1} + \frac{1}{2}\overline{AB} = \vec{b} + \frac{1}{2}\vec{a}$$

$$\overline{AJ} = \overline{AB} + \overline{BJ} = \overline{AB} + \frac{1}{2}\overline{AA_1} = \vec{a} + \frac{1}{2}\vec{b}$$

$$, \quad \vec{c} - \vec{a} = \vec{d} \quad \vec{b} - \vec{a} = \vec{e}$$

$$\overline{EF} = \overline{AF} - \overline{AE} = \vec{c} + \frac{1}{2}\vec{a} - (\vec{a} + \frac{1}{2}\vec{c}) = \frac{1}{2}(\vec{c} - \vec{a}) = \frac{1}{2}\vec{d},$$

$$\overline{EG} = \overline{AG} - \overline{AE} = \vec{c} + \frac{1}{2}\vec{b} - (\vec{a} + \frac{1}{2}\vec{c}) = \frac{1}{2}(\vec{c} - \vec{a}) + \frac{1}{2}(\vec{b} - \vec{a}) = \frac{1}{2}\vec{d} + \frac{1}{2}\vec{e},$$

$$\overline{EH} = \overline{AH} - \overline{AE} = \vec{b} + \frac{1}{2}\vec{c} - (\vec{a} + \frac{1}{2}\vec{c}) = \vec{b} - \vec{a} = \vec{e},$$

$$\overline{EH} = \overline{AH} - \overline{AE} = \vec{b} + \frac{1}{2}\vec{c} - (\vec{a} + \frac{1}{2}\vec{c}) = \vec{b} - \vec{a} = \vec{e},$$

$$\overline{EI} = \overline{AI} - \overline{AE} = \vec{b} + \frac{1}{2}\vec{a} - (\vec{a} + \frac{1}{2}\vec{c}) = \vec{b} - \frac{1}{2}\vec{a} - \frac{1}{2}\vec{c} = (\vec{b} - \vec{a}) - \frac{1}{2}(\vec{c} - \vec{a}) = \vec{e} - \frac{1}{2}\vec{d},$$

$$\overline{EI} = \overline{AI} - \overline{AE} = \vec{b} + \frac{1}{2}\vec{a} - (\vec{a} + \frac{1}{2}\vec{c}) = \vec{b} - \frac{1}{2}\vec{a} - \frac{1}{2}\vec{c} = (\vec{b} - \vec{a}) - \frac{1}{2}(\vec{c} - \vec{a}) = \vec{e} - \frac{1}{2}\vec{d},$$

$$\overline{EJ} = \overline{AJ} - \overline{AE} = \vec{a} + \frac{1}{2}\vec{b} - (\vec{a} + \frac{1}{2}\vec{c}) = \frac{1}{2}\vec{b} - \frac{1}{2}\vec{c} = \frac{1}{2}(\vec{b} - \vec{a}) - \frac{1}{2}(\vec{c} - \vec{a}) = \frac{1}{2}\vec{e} - \frac{1}{2}\vec{d}.$$

$$\overline{EF}, \overline{EG}, \overline{EH}, \overline{EI}, \overline{EJ}$$

$E, F, G, H, I, J,$

(),

$$P = B + M = 6 \cdot \frac{a_p^2 \sqrt{3}}{4} + 6 \cdot \frac{a_p \cdot h}{2}$$

a_p

h

$$a_p = \frac{a\sqrt{2}}{2} = 5\sqrt{2} \text{ cm}$$

).

$$b = \overline{AE} = \overline{ED} = \frac{a}{2}\sqrt{5}$$

().

$$h = \sqrt{b^2 - \left(\frac{a_p}{2}\right)^2} = \sqrt{\left(\frac{a\sqrt{5}}{2}\right)^2 - \left(\frac{a\sqrt{2}}{4}\right)^2} = \sqrt{\frac{18}{16}a^2} = \frac{3\sqrt{2}}{4}a = 7,5\sqrt{2} \text{ cm}$$

$$P = 6 \cdot \frac{(5\sqrt{2})^2 \sqrt{3}}{4} + 6 \cdot \frac{5\sqrt{2} \cdot 7,5\sqrt{2}}{2} = (75\sqrt{3} + 225) \text{ cm}^2 = 75 \cdot (\sqrt{3} + 3) \text{ cm}^2$$

ABCD

EF

$$\dots h = \frac{3}{4}a\sqrt{2}.$$

$$P = 6 \cdot \frac{(5\sqrt{2})^2 \sqrt{3}}{4} + 6 \cdot \frac{5\sqrt{2} \cdot 7,5\sqrt{2}}{2} = 75 \cdot (\sqrt{3} + 3) \text{ cm}^2$$

$$V = \frac{1}{3}B \cdot H,$$

$$B = 6 \cdot \frac{(5\sqrt{2})^2 \sqrt{3}}{4} = 75\sqrt{3} \text{ cm}^2,$$

$$H = \sqrt{b^2 - a_p^2} = \sqrt{\left(\frac{a\sqrt{5}}{2}\right)^2 - \left(\frac{a\sqrt{2}}{2}\right)^2} = \frac{a\sqrt{3}}{2} = 5\sqrt{3} \text{ cm}$$

$$V = \frac{1}{3} \cdot 6 \cdot \frac{(5\sqrt{2})^2 \sqrt{3}}{4} \cdot 5\sqrt{3} = 375 \text{ cm}^3$$

$$\dots H = \frac{1}{2}a\sqrt{3} = 5\sqrt{3} \text{ cm},$$

$$V = \frac{1}{3} \cdot 6 \cdot \frac{(5\sqrt{2})^2 \sqrt{3}}{4} \cdot 5\sqrt{3} = 375 \text{ cm}^3.$$

AEFGHIJ

: *ABEJ, ADFH AA₁IH*.

BEJ

AB

$$\dots V_p = \frac{1}{2}V_k - \frac{1}{8}V_k = \frac{3}{8}V_k = 375 \text{ cm}^3.$$