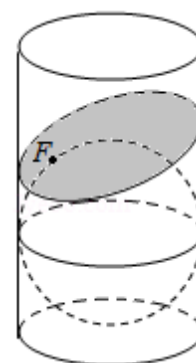


1.  $\bar{a}$  1, 2, 3,  $\bar{b}$   $x^2 - 3x - 50$   $\bar{a} // \bar{b}$   $x$   
 A 1 B 0 C 1 D 2
2.  $a_n$   $a_3$   $a_7$  10  $a_6$  7  $d$   
 A 1 B 2 C 3 D 4
3.  $M$  2 3  $x - 2y - 9 = 0$   
 A  $2x - y - 8 = 0$  B  $x - 2y - 7 = 0$  C  $x - 2y - 4 = 0$  D  $x - 2y - 1 = 0$
4.  $a_n$



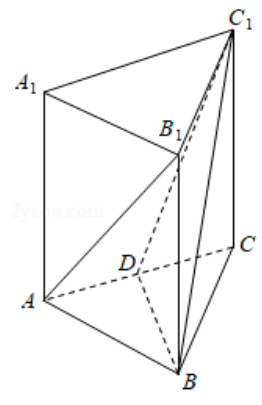
12.  $ABC$   $A_1B_1C$   $BC_1$   $AB_1$   $D$   $AC$   $E$   $BCC_1B_1$

A  $\overline{DA} = \frac{1}{2} \overline{A_1A} + \overline{B_1A} + \overline{BC}$

B  $DE \parallel$   $ABB_1A_1$   $E = \frac{\sqrt{2}}{2} AC$

C  $AD = BC_1 = \frac{\sqrt{6}}{6}$

D  $E = ACC_1A_1 = \frac{\sqrt{3}}{2} EB = E$



4 5 20 2 3 .

13.  $x^2 - 4y = \underline{\hspace{2cm}}$

14.  $S_n = \underline{\hspace{2cm}}$   $a_n = n$   $a_1 = a_2 = 3$   $a_3 = a_4 = 12$

$q = \underline{\hspace{2cm}}$   $S_6 = \underline{\hspace{2cm}}$

15.  $C: x^2 + y^2 - 1 = 0$   $C: l: 3x + y - 12 = 0$   $\underline{\hspace{2cm}}$

$P: l = \underline{\hspace{2cm}}$   $P: C = \underline{\hspace{2cm}}$

16.

$A_k = x|x a_k = 2^k$   $a_{k-1} = 2^{k-1}$   $a_1 = 2^1$   $a_0 = 2^0$   $k \in \mathbf{N}$   $a_k = 1$   $a_0 = a_1 = a_{k-1} = 0 = 1$

$A_1 = 23$   $A_2 = 4567$   $A_4 = \underline{\hspace{2cm}}$

$f(x) = \frac{0}{1}x + \frac{a_0}{a_0}x + \frac{a_1}{a_1}x^2 + \frac{a_2}{a_2}x^3 + \frac{a_k}{a_k}x^k = 1 + x + x^2 + x^3 + \dots + x^k$

$x|f(x) = 1 + x + A_k$   $c_n = \underline{\hspace{2cm}}$   $c_n = \underline{\hspace{2cm}}$

6 70 12 17 10

17.  $10 = a_n = a_1 + 2 + a_3 + a_1 + a_7$

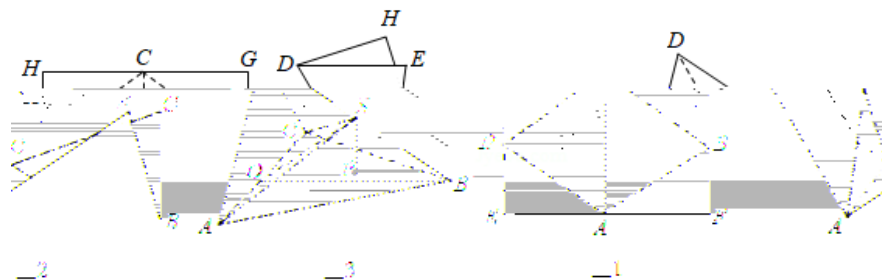
$a_n = \underline{\hspace{2cm}}$   
 $n = a_n = n = S_n = 27$

18.  $12$   $C$   $y^3$   $C$   $A(4,2), D(0,2)$   
 $C$   
 $P(1,1)$   $l$   $C$   $4$   $l$

19.  $12$   $O$   $x$   $C$   $\frac{3}{2}\sqrt{6}$   
 $C$   
 $y$   $x$   $4$   $C$   $OA$   $OB$

20.  $12$   $a_n$   $a_1 - 1$   $na_{n-1}$   $n - 1$   $a_n - 1$   
 $b_n$   $\frac{a_n}{n}$   $b_n$   
 $2^n a_n$   $n$   $S_n$

21. 12 A4  $\sqrt{2}:1$   
 A4 EFCH EF:EH  $\sqrt{2}:1$   
 1 A4 EFCH EF:EH  $\sqrt{2}:1$   
 A B C D EF FG GH HE AB BC CD DA AC 2  
 E F G H S 3 D ABC O AC  
 SOB SP BO  
 SP// ACD  
 M,N AB, BC AM BN B DMN DAB  
 DMN



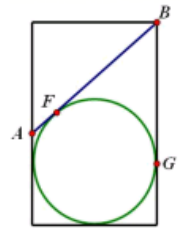
22. 12 PAB A B  $A(0, \sqrt{3})$   $B(0, \sqrt{3})$  PA, PB  
 $\frac{3}{2}$   
 $F_1, F_2$   $|PF_1|$   $|PF_2|$   
 P C, D, E AC, AD y AC AE  
 DE

1-5. CBCDA 6-10. CCDDB

10.

0

$$a = \frac{5}{4}, \quad e = \frac{3}{5}, \quad c = \frac{3}{4}, \quad |BF| = 2, \quad |BG| = 1$$



$$2 \quad 5 \quad 10 .$$

5

$$0 \quad 3 .$$

11. AC 12. BCD

12.

$$\vec{AD} = \frac{1}{2} \vec{AA_1} + \vec{BA_1} + \vec{BC_1}$$

Coordinate system  $Oxyz$  with origin at  $A$ :

$$A \left( \frac{a}{2}, 0, 0 \right), \quad B \left( 0, \frac{\sqrt{3}}{2}a, 0 \right), \quad B_1 \left( 0, \frac{\sqrt{3}}{2}a, b \right), \quad C_1 \left( \frac{a}{2}, 0, b \right)$$

$$\vec{BC_1} = \left( \frac{a}{2}, \frac{\sqrt{3}}{2}a, b \right), \quad \vec{AB_1} = \left( \frac{a}{2}, \frac{\sqrt{3}}{2}a, b \right)$$

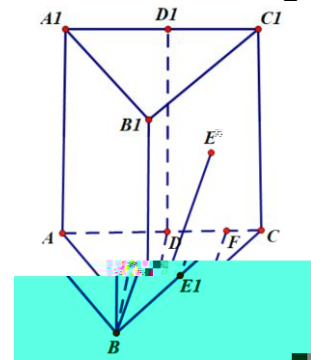
$$\vec{BC_1} \cdot \vec{AB_1} = \frac{a^2}{4} + \frac{3a^2}{4} + b^2 = a^2 + b^2 = 0 \implies b = \frac{\sqrt{2}}{2}a$$

$$DE \parallel \text{plane } ABB_1A_1 \implies |BB_1| = \frac{\sqrt{2}}{2}|AC|$$

Coordinates for  $D$  and  $C_1$ :

$$D \left( 0, 0, 0 \right), \quad C_1 \left( \frac{a}{2}, 0, \frac{\sqrt{2}}{2}a \right)$$

$$\cos \angle \vec{BC_1}, \vec{DA} = \frac{\vec{BC_1} \cdot \vec{DA}}{|\vec{BC_1}| |\vec{DA}|} = \frac{\frac{a^2}{2}}{\frac{a}{2} \cdot \frac{\sqrt{6}}{2}a} = \frac{\sqrt{6}}{6}$$



$$\angle \vec{BC_1}, \vec{DA} = \frac{\sqrt{6}}{6}$$

Line  $DE \parallel \text{plane } ABC$

$$E_1F = \frac{\sqrt{3}}{2}EB$$

Line  $E_1F \parallel \text{plane } ACC_1A_1$

$$E_1F = \frac{\sqrt{3}}{2}EB$$

Line  $CE_1F \parallel \text{plane } E_1F$

$$\frac{\sqrt{3}}{2}E_1C = EB \implies E_1C = \frac{2}{\sqrt{3}}EB$$

Line  $E \parallel \text{plane } BCC_1B_1$

13. (0 1)  $y^4$  14.  $2 \cdot 63$  15.  $\sqrt{10}$   $y^3$   $3x$   $4y^3$   $0$  16.  $376$   $760$
16.  $A_4$   $n|n$   $a_4$   $2^4$   $a_3$   $2^3$   $a_2$   $2^2$   $a_1$   $2^1$   $a_0$   $2^0$   
 $a_4$  1  $a_0$   $a_1$   $a_2$   $a_3$  0  $n$  16  $a_0$   $a_1$   $a_2$   $a_3$   $a_4$  1  $n$  31  
 $A_4$  16 17 18 31 16  $\frac{16 \ 16 \ 31}{2}$  376  
 $a_4$  1  $k$  5  $c_n$  1  
 $a_3$  1  $a_2$  1  $a_1$  1  $a_0$  1 8  
16  $2^5$  8  $2^4$   $2^3$   $2^2$   $2^4$   $2^0$  760  
6 70 17 10
17. 12  
10  $a_n$   $d$   $a_3$   $a_1$   $a_7$   $a_3^2$   $a_1$   $a_7$  1  
 $a_1$  2 2  $2d^2$  2 2  $6d$   $d$  1 4  
 $a_n$   $n$  1 5  
 $S_n$   $\frac{n \ 2 \ n \ 1}{2}$   $\frac{n \ n \ 3}{2}$  7  
 $\frac{n \ n \ 3}{2}$  27  $n^2$   $3n$   $54$  0  $n$  6 9  
 $n$  6  $S_n$  27 10
18. 12  
 $C$   $a,3$   $C$   $x$   $a^2$   $y$   $3^2$   $r^2$  1  
 $A$  4,2 , $B$  0,2  $C$   $4$   $a^2$   $2$   $3^2$   $r^2$   $a$  2 5  
 $a^2$   $2$   $3^2$   $r^2$   $r$   $\sqrt{5}$   
 $C$   $x$   $2^2$   $y$   $3^2$  5 6  
 $C$   $l$   $d$   $\sqrt{5}$  4 1 8  $\mathbb{M}$   $\mathbb{MD}$  20  
 $l$   $x$  1  $l$  1 9  
 $l$   $l:y$  1  $k$   $x$  1  $kx$   $y$   $k$  1 0  
 $C$   $l$   $d$   $\frac{|2k \ 3 \ k \ 1|}{\sqrt{1 \ k^2}}$  1  $k$   $\frac{3}{4}$  11  
 $l$   $y$  1  $\frac{3}{4}$   $x$  1  $3x$   $4y$  1 0  
 $x$  1  $3x$   $4y$  1 0 12
19. 12  
 $y^2$   $2px$ , 2  $\mathbb{M}$   $\mathbb{MD}$  192  
 $C$   $\frac{3}{2}\sqrt{6}$

$$\begin{aligned}
 & y^2 - 4x & x & y^2 - 4y - 16 = 0 & 7 \\
 & y & x & 4 & \\
 20. & A(x_1, y_1), B(x_2, y_2) & & y_1 y_2 = 16 & 8 \\
 & y_1^2 - 4x_1 & x_1 x_2 & \frac{y_1^2 y_2^2}{16} = 16 & 10 \\
 & y_2^2 - 4x_2 & & & \\
 & \overrightarrow{OA} \cdot \overrightarrow{OB} = x_1 x_2 + y_2 y_2 = 0 & & OA \perp OB & 12
 \end{aligned}$$

$$na_{n-1} - (n-1)a_n = 1 \quad n \geq 1 \quad \frac{a_{n-1}}{n-1} - \frac{a_n}{n} = \frac{1}{n(n-1)} \quad 2$$

$$b_n = \frac{a_n}{n} \quad b_{n-1} = b_n \frac{1}{n(n-1)} \quad 3$$

$$b_2 = b_1 \frac{1}{1 \cdot 2} \quad b_3 = b_2 \frac{1}{2 \cdot 3} \quad b_4 = b_3 \frac{1}{3 \cdot 4} \quad b_n = b_{n-1} \frac{1}{n(n-1)}$$

$$b_n = b_1 \frac{1}{1 \cdot 2} \frac{1}{2 \cdot 3} \frac{1}{3 \cdot 4} \dots \frac{1}{n(n-1)}$$

$$1 \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{3} \cdot \frac{1}{3} \cdot \frac{1}{4} \dots \frac{1}{n-1} \cdot \frac{1}{n} = 1 \cdot \frac{1}{n} \quad 5$$

$$b_1 = \frac{1}{a_1} = 1 \quad b_n = 2 \cdot \frac{1}{n} \quad 6$$

$$a_n = nb_n = 2n \cdot \frac{1}{n} = 2 \quad c_n = 2^n \quad a_n = 2n - 1 = 2^n \quad 7$$

$$S_n = 1 + 2^1 + 3 + 2^2 + 5 + 2^3 + \dots + 2n - 3 + 2^{n-1} + 2n - 1 = 2^n \quad 8$$

$$2S_n = 1 + 2^2 + 3 + 2^3 + 5 + 2^4 + \dots + 2n - 3 + 2^n + 2n - 1 = 2^{n+1} - 1 \quad 9$$

$$S_n = 2 + 2 \frac{4 + 1 + 2^{n-1}}{1 + 2} = 2n - 1 + 2^{n-1} \quad 2 + 8 + 2^{n-1} + 1 = 2n - 1 + 2^{n-1} \quad 11$$

$$S_n = 2n - 3 + 2^{n-1} + 6 \quad 12$$

21. 12

$DO = EH = 4a$      $EF = 4\sqrt{2}a$      $BD = DE = FB = 4a$     1  
 $SAC = SA = SC = 2\sqrt{2}a$      $AC = 4a$      $O = AC$      $SO = 2a$     2  
 $SOB = BS = 2a, SP = BO = P = BO$     3  
 $SP \parallel DO$     4  
 $SP \perp ACD$      $DO \perp ACD$      $SP \parallel DO \Rightarrow SP \perp ACD$     5  
 $V_B - DMN = V_D - BMN$      $D = BMN$     6  
 $S_{BMN} = B = DMN$     6  
 $AM = BN = x = 0$      $x = 2\sqrt{3}a$

$\sin \angle MBN = \frac{1}{2}$      $\sin \angle MBN = \frac{1}{2}$      $x = \sqrt{3}a$      $S_{\triangle BMN} = 3a^2 \sin \angle MBN = B = DMN$     7  
 $M, N \in AB, BC$

