

1. (5)

1,2,3,4,6; - 0,2,5,7; - 1,3,5,6,7,8,9? ()
 $: 5^3 \cdot 4^2 \cdot 7^4$
 $: 5^3 \cdot 4^2 \cdot 7^4$
 5 - , ,
 2 - , ,
 0 -

2. (5)

$$\begin{cases} 10^2 + 5^2 - 2^2 - 38 - 6 + 41 = 0, \\ 3^2 - 2^2 + 5^2 - 17 - 6 + 20 = 0. \end{cases}$$

:

$$10^2 + 5^2 - 2^2 - 38 - 6 + 41 = 0$$

$$\frac{D}{4} = (y + 19)^2 - 10(5y^2 - 6y + 41) = -49(y^2 - 2y + 1) = -49(y - 1)^2 \leq 0, \quad \in \mathbf{R}.$$

$$\begin{cases} x = \frac{y + 19}{10}, \\ y - 1 = 0, \\ 3x^2 - 2y^2 + 5x - 17x - 6y + 20 = 0; \end{cases} \Leftrightarrow \begin{cases} x = 2, \\ y = 1, \\ 3 \cdot 4 - 2 + 10 - 34 - 6 + 20 = 0. \end{cases}$$

:(2;1).

5 - , ,
 4 - , ,
 2 - , ,
 1 - , ,
 0 -

3. (7)

400 . . 12 , 500 . . 16 , 600 . . 15
 326 .

: m, n, k

$$f = 100(4m + 5n + 6k)$$

(1)

$$12m + 16n + 15k = 326 \quad m, n, k \in \mathbf{N} \quad (2)$$

$$(2) \quad , \quad k \quad : k = 2s, s \in \mathbf{N} \quad (3)$$

$$(2) \quad 6m + 8n + 15s = 163. \quad (4)$$

$$(4) \quad , \quad s \quad : s = 2p + 1, p, \quad p \geq 0, \quad (5)$$

(4) (5) $3m + 4n + 15p = 74.$ (6)

(6) $n = 3q + 2, q \geq 0,$ (7)

(6) (7) $m + 4q + 5p = 22.$ (8)

(1) (3), (5), (7), (8):

$f = 100(110 - q + 4p), p, q \in \mathbb{R}, p \geq 0, q \geq 0.$

(8) f $p = 4, q = 0, m = 2$ $f_m = 10500.$

$f_m = 12600,$ f $p = 0, q = 5, m = 2$ $f_m = 10500.$

$7 - 10500$ 12600

$5 -$

$3 -$

$1 -$

$0 -$

4. (7)

$4 \sin 3\alpha + 5 \geq 4 \cos 2\alpha + 5 \sin \alpha \quad (\forall \alpha \in \mathbb{R}).$

$\sin 3\alpha = 3 \sin \alpha - 4 \sin^3 \alpha \quad ((\forall \alpha \in \mathbb{R}), \quad 4 \sin 3\alpha + 5 \geq 4 \cos 2\alpha +$

$5 \sin \alpha \Leftrightarrow 16 \sin^3 \alpha - 8 \sin^2 \alpha - 7 \sin \alpha - 1 \leq 0. \quad \forall \alpha \in \mathbb{R}.$

$\sin \alpha, \quad 16^3 - 8^2 - 7 - 1 \leq 0 (*).$

$x \in [-1; 1].$

$(*) \quad 16^3 - 8^2 - 7 - 1 = 1 - P_2(x) = (x-1) \cdot (4x+1)^2,$

$(*) \quad 16^3 - 8^2 - 7 - 1 = (x-1) \cdot (4x+1)^2 \leq 0$

$\forall x \in [-1; 1],$

$7 -$

$5 -$

$2 -$

$1 -$

$0 -$

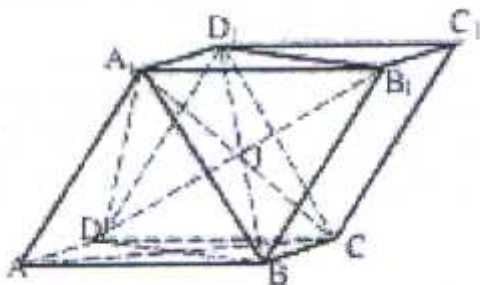
5. (7)

$ABCD A_1 B_1 C_1 D_1 -$

60°

2. BAD, BAA_1, DAA_1

$BDD_1.$



$B_1 D_1$

$J.$

:

$60^\circ,$

2. $BDB_1 D_1 -$

2. $J, J -$

$BDB_1 D_1.$

$DA_1 B_1$

$J \perp B_1 D_1.$

$J \perp B_1 D_1.$

$J \perp B_1 D_1$

1

$$\begin{array}{l}
 A_1 D = 1 = 2, \quad , JD = J, \quad , \quad D_1 \\
 = B_1. \quad : \quad BDB_1 D_1 \quad , \quad BDB_1 D_1 - \quad , \quad 2. \\
 DJ = \sqrt{2}. \quad iJD \quad iJ = \sqrt{2}. \\
 : \sqrt{2}. \\
 7 \quad - \quad , \quad , \\
 5 \quad - \quad , \quad , \\
 2 \quad - \quad , \quad , \\
 1 \quad - \\
 0 \quad -
 \end{array}$$