Пелков Артем, ИВТ2.1

Домашняя работа
№1.2.59

□ $\begin{vmatrix} 2 & -3 \\ 5 & -4 \end{vmatrix} = 2\cdot(-4) - (-3)\cdot 5 = 7$ ■

1.2.60

□ $\begin{vmatrix} \alpha & \beta \\ 0 & 0 \end{vmatrix} = \alpha\cdot 0 - \beta\cdot 0 = 0$ ■

1.2.61

□ $\begin{vmatrix} x^2 & x \\ xy^2 & y^2 \end{vmatrix} = x^2\cdot y^2 - x\cdot y^2\cdot x = 0$ ■

1.2.62.

□ $\begin{vmatrix} \alpha & 3\alpha \\ \beta & 3\beta \end{vmatrix} = \alpha\cdot 3\beta - \beta\cdot 3\alpha = \alpha 3\beta - 3\alpha\beta = 0$ ■

1.2.63

□ $\begin{vmatrix} \cos\alpha & \sin\alpha \\ \sin\alpha & \cos\alpha \end{vmatrix} = \cos^2\alpha - \sin^2\alpha = 1 - 2\sin^2\alpha = \cos 2\alpha$ ■

1.2.64.

$\begin{vmatrix} x & x-1 \\ x^2+x+1 & x^2 \end{vmatrix} = x^3 - (x-1)\cdot(x^2+x+1) = x^3 - (x^3-1) = 1$ ■

1.2.65.

$$\begin{vmatrix} 2x-3 & 4 \\ -x & -3 \end{vmatrix} = (2x-3)\cdot(-3) - (-x)\cdot 4 = -6x+9+4x = -2x+9$$

$-2x+9=0$

$-2x=-9$

$x=4,5$

1.2.66.

$$\begin{vmatrix} x+3 & x+1 \\ x-1 & x-2 \end{vmatrix} = (x+3)\cdot(x-2) - (x-1)\cdot(x+1) = (x^2-2x+3x-6) - (x^2+x-x-1) =$$

$= x^2+x-6-x^2+1 = x-5$

$x-5=0$

$x=5$

1.2.67

$$\begin{vmatrix} 3-x & x+2 \\ x+1 & x-1 \end{vmatrix} = (3-x)\cdot(x-1) - (x+1)\cdot(x+2) = (3x-3-x^2+x) - (x^2+2x+x+2) = -x^2+4x-3-x^2+3x+2 =$$

$= -2x^2+7x-1$

$-2x^2+7x-1=6$

$-2x^2+7x-7=0$

$D = 49-4\cdot(-2)\cdot(-7) = 49-56 = 0$ $\varnothing$

1.2.68.

$$\begin{vmatrix} x-2 & y+3 \\ 1-y & x-2 \end{vmatrix} = (x-2)\cdot(x-2) - (1-y)\cdot(y+3) = (x^2-2x-2x+4) - (y+3-y^2-3y) = x^2-4x+y^2+2y+1$$

$x^2-4x+y^2+2y+1=-4$

$x^2-4x+y^2+2y+5=0$

1.2.69.

$$\square \begin{vmatrix} x-2 & y+3 \\ 7-y & x+4 \end{vmatrix} = (x-2)\cdot(x+4) - (7-y)\cdot(y+3) = x^2+4x-2x-8 - (7y+21-y^2-3y) = x^2+2x+y^2-4y-29$$

$$x^2+2x+y^2-4y-29 = -34$$

$$x^2+2x+y^2-4y+5=0$$

1.2.70.

$$\square \begin{vmatrix} \sin 2x & -\sin 3x \\ \cos 2x & \cos 3x \end{vmatrix} = (\sin 2x \cdot \cos 3x) - (\cos 2x \cdot (-\sin 3x)) = \sin 2x \cos 3x + \sin 3x \cdot \cos 2x$$

1.2.71.

$$\square \begin{vmatrix} 1 & 1 & 1 \\ 2 & 3 & 5 \\ 4 & 6 & 7 \end{vmatrix} = 1\cdot\begin{vmatrix} 3 & 3 \\ 6 & 7 \end{vmatrix} - 1\cdot\begin{vmatrix} 2 & 3 \\ 4 & 7 \end{vmatrix} + 1\cdot\begin{vmatrix} 2 & 3 \\ 4 & 6 \end{vmatrix} = 3-2+0 = 1$$

1.2.72.

$$\square \begin{vmatrix} 1 & 1 & 0 \\ 2 & 3 & 1 \\ 0 & 2 & 3 \end{vmatrix} = 1\cdot\begin{vmatrix} 3 & 1 \\ 2 & 3 \end{vmatrix} - 1\cdot\begin{vmatrix} 2 & 1 \\ 0 & 3 \end{vmatrix} = 7-6 = 1$$

1.2.73.

$$\square \begin{vmatrix} -2 & 3 & 5 \\ 4 & 1 & -2 \\ 1 & -3 & 2 \end{vmatrix} = -2\cdot\begin{vmatrix} 1 & -2 \\ -3 & 2 \end{vmatrix} - 3\cdot\begin{vmatrix} 4 & -2 \\ 1 & 2 \end{vmatrix} + 5\begin{vmatrix} 4 & 1 \\ 1 & -3 \end{vmatrix} =$$

$$= 8 - 30 - 65 = -87$$

1.2.74

$$\square \begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix} = a\cdot\begin{vmatrix} c & a \\ a & b \end{vmatrix} - b\begin{vmatrix} b & a \\ c & b \end{vmatrix} + c\begin{vmatrix} b & c \\ c & a \end{vmatrix} = -a^3 + 3abc - b^3 - c^3$$

1.2.75.

$$\square \begin{vmatrix} \alpha & 0 & 0 \\ 0 & \beta & 0 \\ 0 & 0 & \gamma \end{vmatrix} = 0\cdot\alpha\cdot 0 + \alpha\cdot\beta\cdot\gamma + 0\cdot 0\cdot 0 - 0\cdot\beta\cdot 0 - 0\cdot 0\cdot\alpha - 0\cdot\gamma\cdot 0 = \alpha\beta\gamma$$

1.2.76

$$\square \begin{vmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{vmatrix} = 0\cdot 0\cdot 0 + 1\cdot 1\cdot 1 + 1\cdot 1\cdot 1 - 1\cdot 1\cdot 0 - 1\cdot 0\cdot 1 - 1\cdot 1\cdot 0 = 2$$

1.2.77

$$\square \begin{vmatrix} \cos\alpha & \cos\beta & 0 \\ \cos\alpha & 0 & \cos\gamma \\ 0 & \cos\beta & \cos\gamma \end{vmatrix} = \cos\alpha\cdot\cos^{0}\beta\cdot 0 + \cos\alpha\cdot 0\cdot\cos^{0}\gamma + \cos\beta\cdot\cos^{0}\gamma\cdot 0 - \cos\alpha\cdot\cos\beta\cdot\cos\gamma - 0\cdot 0\cdot 0 - \cos\beta\cdot\cos\gamma\cdot\cos\alpha = -\cos\alpha\cdot\cos\beta\cdot\cos\gamma - \cos\beta\cdot\cos\gamma\cdot\cos\alpha = -2\cdot\cos\beta\cdot\cos\gamma\cdot\cos\alpha$$

1.2.78.

$$\square \begin{vmatrix} 0 & x & 0 \\ x & 1 & x \\ 0 & x & 0 \end{vmatrix} = 0\cdot 1\cdot 0 + x\cdot x\cdot 0 + x\cdot x\cdot 0 - 0\cdot 1\cdot 0 - 0\cdot x\cdot x - 0\cdot x\cdot x = 0$$

1.2.79.

$$\begin{vmatrix} 2 & 3 & 5 \\ 0 & -1 & 0 \\ 6 & 7 & 8 \end{vmatrix} = -0 \cdot \begin{vmatrix} 3 & 5 \\ 7 & 8 \end{vmatrix} + (-1) \cdot \begin{vmatrix} 2 & 5 \\ 6 & 8 \end{vmatrix} - 0 \begin{vmatrix} 2 & 3 \\ 6 & 7 \end{vmatrix} =$$

$$= 14$$

1.2.80.

$$\begin{vmatrix} 1 & 2 & 0 \\ 3 & 4 & 0 \\ 5 & 6 & 7 \end{vmatrix} = 7 \cdot \begin{vmatrix} 1 & 2 \\ 3 & 4 \end{vmatrix} = 14$$

1.2.81.

$$\begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 0 \end{vmatrix} = 3 \cdot \begin{vmatrix} 4 & 5 \\ 7 & 8 \end{vmatrix} - 6 \begin{vmatrix} 1 & 2 \\ 7 & 8 \end{vmatrix} = -9 - 36 = -45$$

1.2.82.

$$\begin{vmatrix} x & y & z \\ 0 & y & z \\ x & 0 & z \end{vmatrix} = z \begin{vmatrix} 0 & y \\ x & 0 \end{vmatrix} - z \begin{vmatrix} x & y \\ x & 0 \end{vmatrix} + z \begin{vmatrix} x & y \\ 0 & y \end{vmatrix} =$$

$$= xyz - xyz - xyz = -xyz$$

1.2.83.

$$\begin{vmatrix} \cos\alpha & \cos\beta & \cos\gamma \\ 1 & 1 & 0 \\ 1 & 0 & 1 \end{vmatrix} = 1 \begin{vmatrix} \cos\beta & \cos\gamma \\ 1 & 0 \end{vmatrix} + 1 \begin{vmatrix} \cos\alpha & \cos\beta \\ 1 & 1 \end{vmatrix} =$$

$$= \cos\gamma + \cos\beta - \cos\alpha$$

1.2.84

$$\begin{vmatrix} -3 & 2 & 1 \\ x-1 & 0 & 7 \\ 2 & -1 & 3 \end{vmatrix} = 0 + (x-1)\cdot(-1)\cdot 1 + (-3)\cdot 0\cdot 3 + 1\cdot 2\cdot 7 - 2 - (x-1)\cdot 2\cdot 3 - 2\cdot 0\cdot 1 - (-1)\cdot 7\cdot(-3) =$$

$$= 1 - x + 28 - 6x - 6 - 21 = -7x + 2$$

$$-7x + 2 = 0$$

$$-7x = -2$$

$$x = \frac{2}{7}$$

1.2.85

$$\begin{vmatrix} 2 & 0 & -1 \\ 1 & x+5 & 2-x \\ 3 & -1 & 2 \end{vmatrix} = 1 + 4x + 20 + 3x + 15 + 4 - x =$$

$$= 6x + 40$$

$$6x + 40 \leq 4$$

$$6x \leq -36$$

$$x \leq -6$$

1.2.86

$$\begin{vmatrix} x+2 & 4 & -1 \\ -2 & 2 & x-1 \\ 1 & 3 & 0 \end{vmatrix} = 6 + 2x + 4 + 4x - 4 + 2 - 3x^2 - 3x =$$

$$= 6 = -3x^2 + 3x + 14 =$$

$$-3x^2 + 3x + 14 = 0 \quad \cdot(-1)$$

$$3x^2 - 3x - 14 = 0$$

$$D = 9 - 4\cdot 3\cdot(-14) = 168 = \sqrt{168}$$

$$x_{1,2} = \frac{3 \pm \sqrt{168}}{6}$$

1.2.88

□ $\begin{vmatrix} 3 & 2 & -1 \\ x+2 & 0 & 1 \\ -2 & 3x & 1 \end{vmatrix} = 3x^2 - x - 6 - 4 - 2x - 4 + 3x - 9 =$

$= x^2 - 23$

$x^2 - 23 < 0$

$x^2 < 23$

$x < \sqrt{23}$

1.2.89 - не понял, как делать

1.2.90. - не понял, как делать

1.2.91. - не понял, как делать

1.2.92. - не понял, как делать

1.2.93. - не поня, как делать

1.2.94.

□ $\begin{vmatrix} x & a & b & 0 & c \\ 0 & y & 0 & 0 & d \\ 0 & e & z & 0 & f \\ 0 & 0 & 0 & 0 & v \\ g & h & k & u & l \end{vmatrix} = -v \begin{vmatrix} x & a & b & 0 \\ 0 & y & 0 & 0 \\ 0 & e & z & 0 \\ g & h & k & u \end{vmatrix} =$

$= -v \cdot u \begin{vmatrix} x & a & b \\ 0 & y & 0 \\ 0 & e & z \end{vmatrix} = -v \cdot u \cdot x y z =$

$= -vuxyz$

1.2.95.

$$\begin{vmatrix} 0 & 5 & 2 & 0 \\ 8 & 3 & 5 & 4 \\ 7 & 2 & 4 & 1 \\ 1 & 4 & 1 & 0 \end{vmatrix} = 4 \cdot \begin{vmatrix} 0 & 2 & 0 \\ 8 & 5 & 4 \\ 7 & 4 & 1 \end{vmatrix} - 1 \cdot \begin{vmatrix} 0 & 5 & 0 \\ 8 & 3 & 4 \\ 7 & 2 & 1 \end{vmatrix} =$$

$$= 4 \cdot 40 - 1 \cdot 100 = 160 - 100 = 60$$

1.2.99.

$$\begin{vmatrix} 3 & 6 & 5 & 6 & 4 \\ 5 & 9 & 7 & 8 & 6 \\ 6 & 12 & 13 & 9 & 7 \\ 4 & 6 & 6 & 5 & 4 \\ 2 & 5 & 4 & 5 & 3 \end{vmatrix} = 3 \begin{vmatrix} 9 & 7 & 8 & 6 \\ 12 & 13 & 9 & 7 \\ 6 & 6 & 5 & 4 \\ 5 & 4 & 5 & 3 \end{vmatrix} - 6 \begin{vmatrix} 5 & 7 & 8 & 6 \\ 6 & 13 & 9 & 7 \\ 4 & 6 & 5 & 4 \\ 2 & 4 & 5 & 3 \end{vmatrix} +$$

$$+5 \begin{vmatrix} 5 & 9 & 8 & 6 \\ 6 & 12 & 9 & 7 \\ 4 & 6 & 5 & 4 \\ 2 & 5 & 5 & 3 \end{vmatrix} - 6 \begin{vmatrix} 5 & 9 & 7 & 6 \\ 6 & 12 & 13 & 7 \\ 4 & 6 & 6 & 4 \\ 2 & 5 & 4 & 3 \end{vmatrix} + 4 \begin{vmatrix} 5 & 9 & 7 & 8 \\ 6 & 12 & 13 & 9 \\ 4 & 6 & 6 & 5 \\ 2 & 5 & 4 & 5 \end{vmatrix} =$$

$$= 3 \left| 9 \begin{vmatrix} 13 & 9 & 7 \\ 6 & 5 & 4 \\ 4 & 5 & 3 \end{vmatrix} - 7 \begin{vmatrix} 12 & 9 & 7 \\ 6 & 5 & 4 \\ 5 & 5 & 3 \end{vmatrix} + 8 \begin{vmatrix} 12 & 13 & 7 \\ 6 & 6 & 4 \\ 5 & 4 & 3 \end{vmatrix} - \right.$$

$$- 6 \left| \begin{vmatrix} 12 & 13 & 9 \\ 6 & 6 & 5 \\ 5 & 4 & 5 \end{vmatrix} - 6 \right| 5 \begin{vmatrix} 13 & 9 & 7 \\ 6 & 5 & 4 \\ 4 & 5 & 3 \end{vmatrix} - 7 \begin{vmatrix} 6 & 9 & 7 \\ 4 & 5 & 4 \\ 2 & 5 & 3 \end{vmatrix} +$$

$$+ 8 \left| \begin{vmatrix} 6 & 13 & 7 \\ 4 & 6 & 4 \\ 2 & 4 & 3 \end{vmatrix} - 6 \right| \begin{vmatrix} 6 & 13 & 9 \\ 4 & 6 & 5 \\ 2 & 4 & 5 \end{vmatrix} \Big| + 5 \left| 5 \right| \begin{vmatrix} 12 & 9 & 7 \\ 6 & 5 & 4 \\ 5 & 5 & 3 \end{vmatrix} -$$

$$-9\begin{vmatrix} 6 & 9 & 7 \\ 4 & 5 & 4 \\ 2 & 5 & 3 \end{vmatrix} + 8\begin{vmatrix} 6 & 12 & 7 \\ 4 & 6 & 4 \\ 2 & 5 & 3 \end{vmatrix} - 6\begin{vmatrix} 6 & 12 & 9 \\ 4 & 6 & 5 \\ 2 & 5 & 5 \end{vmatrix} - 6\begin{vmatrix} 5 & 12 & 13 & 7 \\ 6 & 6 & 4 & \\ 5 & 4 & 3 & \end{vmatrix} -$$

$$-9\begin{vmatrix} 6 & 13 & 7 \\ 4 & 6 & 4 \\ 2 & 4 & 3 \end{vmatrix} + 7\begin{vmatrix} 6 & 12 & 7 \\ 4 & 6 & 4 \\ 2 & 5 & 3 \end{vmatrix} - 6\begin{vmatrix} 6 & 12 & 13 \\ 4 & 6 & 6 \\ 2 & 5 & 4 \end{vmatrix} +$$

$$+4\begin{vmatrix} 5 & 12 & 13 & 9 \\ & 6 & 6 & 5 \\ & 5 & 4 & 5 \end{vmatrix} - 9\begin{vmatrix} 6 & 13 & 9 \\ 4 & 6 & 5 \\ 2 & 4 & 5 \end{vmatrix} + 7\begin{vmatrix} 6 & 12 & 9 \\ 4 & 6 & 5 \\ 2 & 5 & 5 \end{vmatrix} - 8\begin{vmatrix} 6 & 12 & 13 \\ 4 & 6 & 6 \\ 2 & 5 & 4 \end{vmatrix} =$$

$$= 3\left|9\cdot(-13) - 7\cdot(-7) + 8(8) - 6(1)\right| - 6\left|5\cdot(-13) -\right.$$

$$\left. - 7(4) + 8(-12) - 6(-34)\right| + 5\left|5\cdot\frac{1}{-4}\cdot(-7) - 9(4) + 8(-4) -\right.$$

$$\left. -6(-18)\right| - 6\left|5(8) - 9(-12) + 7\left(\frac{-36}{-4}\right) - 6(20)\right| +$$

$$+ 4\left|5(1) - 9(-34) + 7(-18) - 8(20)\right| = 5$$