

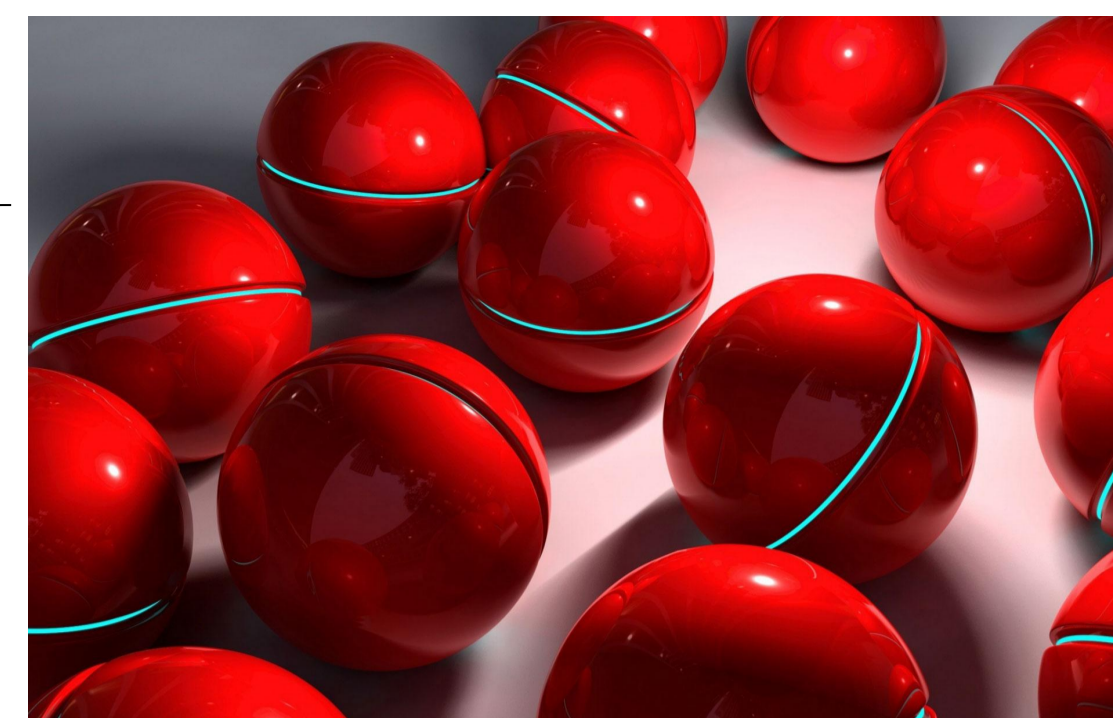
Перемножалка

- 1) $(x^2 - 3x)(x - 1)(x - 2) = 24$
- 2) $(x^2 - 5x)(x + 3)(x - 8) + 108 = 0$
- 3) $(x + 4)^2(x + 10)(x - 2) + 243 = 0$
- 4) $x(x + 3)(x + 5)(x + 8) + 56 = 0$
- 5) $(x - 3)(x - 4)(x - 5)(x - 6) = 1680$
- 6) $(x - 2)(x - 3)^2(x - 4) = 20$
- 7) $(x - 4)(x - 3)(x - 2)(x - 1) = 24$

$$\sqrt{1681} = 41$$

$$\begin{array}{r} 81 \\ \times 1 \\ \hline 81 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 16 \\ \times 0 \\ \hline 0 \\ \hline 16 \\ \hline 0 \end{array}$$



$$1) (x^2 - 3x)(x - 1)(x - 2) = 24$$

$$(x^2 - 3x)(x^2 - 3x - 2) = 24$$

пусть $x^2 - 3x = y$

$$y(y - 2) = 24$$

$$y^2 - 2y = 24$$

$$y^2 - 2y - 24 = 0$$

$$y_1 = -4$$

$$y_2 = 6$$

$$1) x^2 - 3x = -4$$

$$2) x^2 - 3x = 6$$

$$1) x^2 - 3x + 4 = 0$$

решений нет

$$2) x^2 - 3x - 6 = 0$$

$$D = 9 - 4 \cdot (-6) = 9 + 24 = 33$$

$$x_1 = (3 + \sqrt{33})/2$$

$$x_2 = (3 - \sqrt{33})/2$$

$$2) (x^2 - 5x)(x + 3)(x - 8) + 108 = 0$$

$$(x^2 - 5x)(x^2 - 5x - 24) + 108 = 0$$

$$y = x^2 - 5x$$

$$y(y - 24) + 108 = 0$$

$$y^2 - 24y + 108 = 0$$

$$D/4 = 144 - 108 = 36$$

$$y_1 = (12 + 6) = 18$$

$$y_2 = (12 - 6) = 6$$

$$x^2 - 5x = 18$$

$$D = 25 + 72 = 97$$

$$x_1 = (5 + \sqrt{97})/2$$

$$x_2 = (5 - \sqrt{97})/2$$

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

$$D = 25 + 24 = 49$$

$$x_3 = (5 + 7)/2 = 12/2 = 6$$

$$x_4 = (5 - 7)/2 = -1$$

Ответ: 6; -1; $(5 + \sqrt{97})/2$; $(5 - \sqrt{97})/2$

$$3) (x + 4)^2(x + 10)(x - 2) + 243 = 0$$

$$(x^2 + 8x + 16)(x^2 + 8x - 20) + 243 = 0$$

$$y = x^2 + 8x$$

$$(y + 16)(y - 20) + 243 = 0$$

$$y^2 - 4y - 77 = 0$$

$$D/4 = 4 + 77 = 81$$

$$y_1 = (2 + 9) = 11$$

$$y_2 = (2 - 9) = -7$$

$$x^2 + 8x = 11$$

$$D/4 = 16 + 11 = 27$$

$$x_1 = (-4 + 3\sqrt{3})$$

$$x_2 = (-4 - 3\sqrt{3})$$

$$x^2 + 8x = -7$$

$$D/4 = 16 - 7 = 9$$

$$x_3 = (-4 + 3) = -1$$

$$x_4 = -4 - 3 = -7$$

Ответ: -1; -7; $(-4 + 3\sqrt{3})$; $(-4 - 3\sqrt{3})$

$$4) x(x + 3)(x + 5)(x + 8) + 56 = 0$$

$$(x^2 + 8x + 15)(x^2 + 8x) + 56 = 0$$

$$y = x^2 + 8x$$

$$(y + 15)y + 56 = 0$$

$$y^2 + 15y + 56 = 0$$

$$y_1 = -8$$

$$y_2 = -7$$

$$x^2 + 8x = -8$$

$$D/4 = 16 - 8 = 8$$

$$x_1 = (-4 + 2\sqrt{2})$$

$$x_2 = (-4 - 2\sqrt{2})$$

$$x^2 + 8x = -7$$

$$D/4 = 16 - 7 = 9$$

$$x_1 = -1$$

$$x_2 = -7$$

Ответ: -1; -7; $(-4 - 2\sqrt{2})$; $(-4 + 2\sqrt{2})$

$$5) (x - 3)(x - 4)(x - 5)(x - 6) = 1680$$

$$(x^2 - 9x + 18)(x^2 - 9x + 20) = 1680$$

пусть $y = x^2 - 9x$

$$(y + 18)(y + 20) = 1680$$

$$y^2 + y + 20 + y + 18 + 360 = 1680$$

$$y^2 + y + 38 + 360 - 1680 = 0$$

$$y^2 + y + 38 - 1320 = 0$$

$$D/4 = 361 + 1320 = 1681$$

$$y_1 = (-19 + 41) = 22$$

$$y_2 = (-19 - 41) = -60$$

$$x^2 - 9x = 22$$

$$D = 81 + 88 = 169$$

$$x_1 = (9 + 13)/2 = 22/2 = 11$$

$$x_2 = (9 - 13)/2 = -2$$

$$x^2 - 9x = -60$$

$$D = 81 - 240$$

реш нет

ответ: -2; 11

$$6) (x - 2)(x - 3)^2(x - 4) = 20$$

$$(x^2 - 6x + 8)(x^2 - 6x + 9) = 20$$

$$y = x^2 - 6x$$

$$(y + 8)(y + 9) - 20 = 0$$

$$y^2 + 9y + 8y + 72 - 20 = 0$$

$$y^2 + 17y + 52 = 0$$

$$y_1 = -4$$

$$y_2 = -13$$

$$x^2 - 6x + 4 = 0$$

$$D/4 = 9 - 4 = 5$$

$$x_1 = (3 - \sqrt{5})$$

$$x_2 = (3 + \sqrt{5})$$

$$x^2 - 6x + 13 = 0$$

$$D/4 = 9 - 13 = -4$$

кор нет

Ответ: $(3 + \sqrt{5})$; $(3 - \sqrt{5})$

$$7) (x - 4)(x - 3)(x - 2)(x - 1) = 24$$

$$(x^2 - 5x + 4)(x^2 - 5x + 6) = 24$$

$$y = x^2 - 5x$$

$$(y + 4)(y + 6) - 24 = 0$$

$$y^2 + 6y + 4y + 24 - 24 = 0$$

$$y^2 + 10y = 0$$

$$y(y + 10) = 0$$

$$y_1 = 0$$

$$y_2 = -10$$

$$x^2 - 5x = 0$$

$$x(x - 5) = 0$$

$$x_1 = 0$$

$$x_2 = 5$$

$$x^2 - 5x + 10 = 0$$

$$D = 25 - 40$$

Ответ: 0; 5