

Перемножалка

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

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

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

пусть $x^2 - 3x = y$

$y(y + 2) = 24$

$y^2 + 2y = 24$

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

$y_1 = -6$

$y_2 = 4$

$x^2 - 3x = -6$

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

$D = 9 - 24$

$x^2 - 3x = 4$

$x^2 - 3x - 4 = 0$

$x_1 = 4$

$x_2 = -1$

Ответ: 4; -1

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

$(x^2 - 5x)(x^2 - 8x + 3x - 24) + 108 = 0$

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

$x^2 - 5x = y$

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

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

$D = 144 - 108 = 36$

$y_1 = (12 - 6) / 1 = 6$

$y_2 = (12 + 6) / 1 = 18$

$x^2 - 5x - 6 = 0$

$x_1 = 6$

$x_2 = -1$

$x^2 - 5x - 18 = 0$

$D = 25 + 72 = 97$

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

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

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

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

$(x + 4)^2(x^2 - 2x + 10x - 20) + 243 = 0$

$(x + 4)^2(x^2 + 8x - 20) + 243 = 0$

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

$x^2 + 8x = y$

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

$y^2 - 20y + 16y - 320 + 243 = 0$

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

$y_1 = 11$

$y_2 = -7$

$x^2 + 8x - 11 = 0$

$D = 16 + 11 = 27$

$x_1 = (-4 - \sqrt{27}) / 1$

$x_2 = (-4 + \sqrt{27}) / 1$

$x^2 + 8x + 7 = 0$

$x_1 = -7$

$x_2 = -1$

Ответ: $(-4 - \sqrt{27}) / 1$; $(-4 + \sqrt{27}) / 1$; -7; -1.

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

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

$x^2 + 8x = y$

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

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

$y_1 = -8$

$y_2 = -7$

$x^2 + 8x + 8 = 0$

$D = 16 - 8 = 8$

$x_1 = (-4 - \sqrt{8}) / 1$

$x_2 = (-4 + \sqrt{8}) / 1$

$x^2 + 8x + 7 = 0$

$x_1 = -7$

$x_2 = -1$

Ответ: $(-4 - \sqrt{8}) / 1$; $(-4 + \sqrt{8}) / 1$; -7; -1.

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

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

$x^2 - 5x = c$

$(c + 4)(c + 6) = 24$

$c^2 + 10c + 24 = 24$

$c^2 + 10c = 0$

$c(c + 10) = 0$

$c_1 = 0$

$x^2 - 5x = 0$

$x(x - 5) = 0$

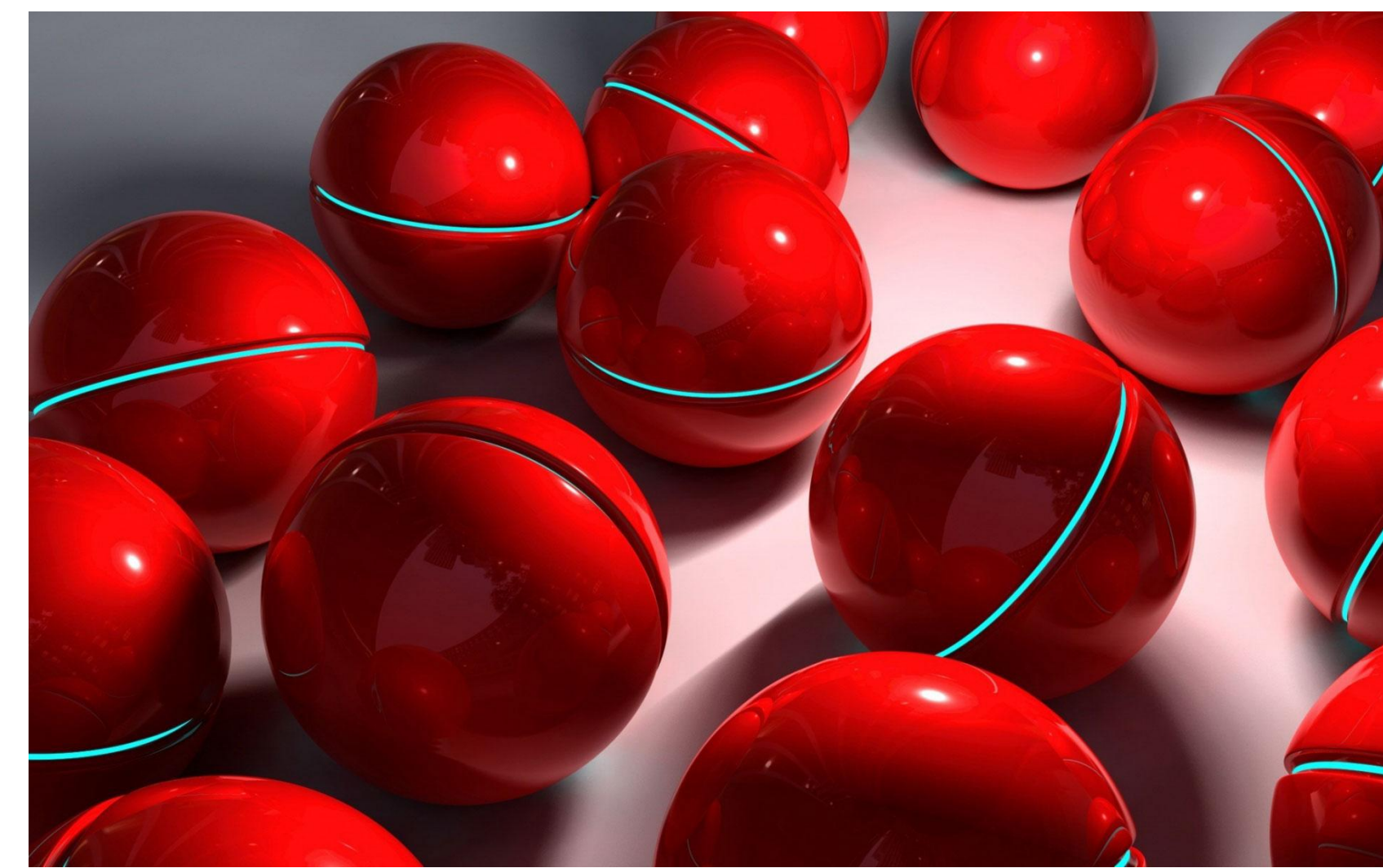
$x_1 = 0$

$x_2 = 5$

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

$D = 25 - 40 = -15$

Ответ: 0; 5.



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

$(x^2 - 6x - 3x + 18)(x^2 - 5x - 4x + 20) = 1680$

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

$x^2 - 9x = y$

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

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

$y^2 + 38y = 1320$

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

$D = 361 + 1320 = 1681$

$y_1 = (-19 + 41) / 1 = 22$

$y_2 = (-19 - 41) / 1 = -60$

$x^2 - 9x - 22 = 0$

$x_1 = 11$

$x_2 = -2$

$x^2 - 9x + 60 = 0$

$D = 81 - 240 = -159$

Ответ: 11; -2.

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

$(x^2 - 4x - 2x + 8)(x^2 - 6x + 9) = 20$

$x^2 - 6x = c$

$(c + 8)(c + 9) = 20$

$c^2 + 17c + 72 = 20$

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

$c_1 = -13$

$c_2 = -4$

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

$D = 9 - 13 = -4$

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

$D = 9 - 4 = 5$

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

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

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