

Группировка

1)  $x^3 + x^2 - 4x - 4 = 0$   
 $x^2(x+1) - 4(x+1) = 0$   
 $(x^2 - 4)(x+1) = 0$   
 $(x^2 - 4) = 0$  или  $(x+1) = 0$   
 $x^2 = 4$   
 $x = \pm 2$   
 $x + 1 = 0$   
 $x = -1$

ответ: -1; -2; 2

2)  $3x^3 + 5x^2 + 5x + 3 = 0$   
 $3(x^3 + 1) + 5x(x+1) = 0$   
 $3(x+1)(x^2 - x + 1) + 5x(x+1) = 0$   
 $(x+1)(3(x^2 + 1) + 5x) = 0$   
 $x + 1 = 0$  или  $3(x^2 + 1) + 5x = 0$   
 $x = -1$

$3x^2 + 5x + 3 = 0$

$d = 25 - 36 = -11$

ответ: -1

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

$x = -2$

$x^3 = 1$

$x = 1$

ответ: -2, 1

4)  $x^3 - x^2 - 81x + 81 = 0$   
 $x^2(x-1) - 81(x-1) = 0$   
 $(x^2 - 81)(x-1) = 0$   
 $x - 1 = 0$  или  $x^2 - 81 = 0$

$x = 1$

$x^2 = 81$

$x = \pm 9$

ответ: -9, 1

5)  $x^3 + 3x^2 - 16x - 48 = 0$   
 $x^2(x+3) - 16(x+3) = 0$   
 $(x^2 - 16)(x+3) = 0$   
 $x^2 - 16 = 0$  или  $x + 3 = 0$

$x^2 = 16$

$x = \pm 4$

$x + 3 = 0$

$x = -3$

ответ: 4, -4, -3

6)  $2x^4 + 3x^3 + 16x + 24 = 0$   
 $x^3(2x+3) + 8(2x+3) = 0$   
 $(2x+3)(x^3 + 8) = 0$   
 $2x + 3 = 0$  или  $x^3 + 8 = 0$

$2x = -3$

$x = -1.5$

$x^3 = -8$

$x = -2$

ответ: 2, -1.5

7)  $24x^4 + 16x^3 - 3x - 2 = 0$   
 $8x^3(3x+2) - (3x+2) = 0$   
 $(3x+2)(8x^3 - 1) = 0$   
 $3x + 2 = 0$  или  $8x^3 - 1 = 0$   
 $3x = -2$

$x = -2/3$

$8x^3 = 1$

$x = 1/2$

ответ: -2/3, 1/2

8)  $x^3 + 5x^2 + 15x + 27 = 0$   
 $x^3 + 27 + 5x(x+3) = 0$   
 $(x+3)(x^2 - 3x + 9) + 5x(x+3) = 0$   
 $(x+3)(x^2 + 2x + 9) = 0$   
 $x + 3 = 0$  или  $x^2 + 2x + 9 = 0$

$x = -3$

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

$d = (4 - 36) = -32$  корней нет

ответ: -3

$ax^2 + bx + c = 0$

$D = (b^2 - 4ac)$

$x = (-b - \sqrt{D}) / (2a)$

$x = (-b + \sqrt{D}) / (2a)$

9)  $8x^3 - 6x^2 + 3x - 1 = 0$   
 $-3x(2x-1) + (2x)^3 - 1^3 = 0$   
 $-3x(2x-1) + (2x-1)(4x^2 + 2x + 1) = 0$   
 $(2x-1)((4x^2 + 2x + 1) - 3x) = 0$   
 $(2x-1)(4x^2 + 1 - x) = 0$   
 $2x - 1 = 0$  или  $4x^2 + 1 - x = 0$

$2x = 1$

$x = 0.5$

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

$d = ((-1)^2 - 16) = -15$

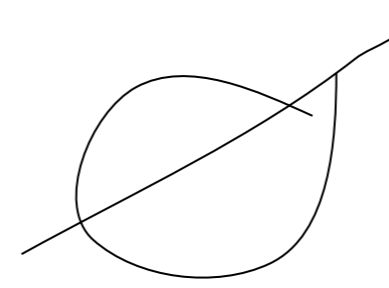
корней нет

ответ: 0.5

шесть примеров красных дз

СИСТЕМА

$$\begin{cases} x^2 - 4 = 0 \\ x + 1 = 0 \end{cases}$$



СОВОКУПНОСТЬ



$$\begin{aligned} a^3 - b^3 &= a^3 + a^2b - b^3 - b^2a - a^2b + b^2a = \\ &= a^2(a+b) - b^2(a+b) + ab(-a+b) = (a^2 - b^2)(a+b) + \\ &+ ab(-a+b) = (a+b)(a-b)(a+b) - ab(a-b) = \\ &= (a-b)((a+b)(a+b) - ab) = (a-b)(a^2 + 2ab + b^2 - ab) = \\ &= (a-b)(a^2 + ab + b^2) \end{aligned}$$

$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$

$a^2 - b^2 = (a+b)(a-b)$

$\deg(a^5b^2) = 7$