Группировка

1) x^3 + x^2 − 4x − 4 = 0

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

3) x^4 + 2x^3 − x − 2 = 0

4) x^3 − x^2 − 81x + 81 = 0

5) x^3 + 3x^2 − 16x − 48 = 0

6) 2x^4+ 3x^3 + 16x + 24 = 0

7) 24x^4 + 16x^3 − 3x − 2 = 0

8) x^3 + 5x^2 + 15x + 27 = 0

9) 8x^3 − 6x^2 + 3x − 1 = 0

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)=0
x^2=4
x1=2
x2=-2
or
x+1=0
x3=-1
Answer: 2,-2,-1

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 or (x+3)=0;
x^2-16=0
x^2=16
x=V16
x1=4
x2=-4
or
x+3=0
x3=-3
Answer: 4;-4;-3

24x^4 + 16x^3 − 3x − 2 = 0
8x^3(3x+2)-1(3x+2)=0
(8x^3-1)(3x+2)=0
(8x^3-1)=0 or (3x+2)=0
3x+2=0
x1=-(⅔)
or
8x^3-1=0
x^3=⅛
x2=½

Answer: -2/3 ; ½

x^3 + 5x^2 + 15x + 27 = 0;
x^3+3^3+15x+5x^2=0;
(x+3)(x^2-3x+9)+5x(x+3)=0;
(x+3)(x^2-3x+9+5x)=0;
(x+3)=0 or (x^2+2x+9)=0;
x1=-3
or
x^2+2x+9=0;
*D=2^2-4*9=4-36=-32; D<0;*
no solutions

3x^3 + 5x^2 + 5x+3 = 0
3x^3 + 3 + 5x^2 + 5x=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-x+1)+5x]=0
(x+1)*[3x^2-3x+3+5x]=0;
(x+1)*[3x^2+2x+3]=0;
(x+1)=0
x1=-1;
or
(3x^2+2x+3)=0
D=4-4*3*3=4-36=-32; D<0

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

(x-1)
x1=1
or
(x+2)
x2=-2
or
(x^2+x+1)
D=1-4=-3; D<0

Answer: 1;-2

x^3 − x^2 − 81x + 81 = 0
x^3 - x^2 - 81x + 81=0
x^3-81x-x^2+81=0
x(x^2-81)-1(x^2-81)=0
(x-1)(x^2-81)=0
x-1=0
x1=1

x^2-81=0
x2=9
x3=-9

Answer: 1;9;-9

2x^4+ 3x^3 + 16x + 24 = 0
2x^4+16x+3x^3+24=0
2x(x^3+8)+3(x^3+8)=0
(2x+3)(x^3+8)=0
2x+3=0
x1=-3/2

(x^3+8)=0
x2=-2

Answer: -3/2;-2

8x^3 − 6x^2 + 3x − 1 = 0
8x^3-1-6x^2+3x=0
1(8x^3-1)-3x(2x-1)=0
1(2x-1)((2x)^2+2x+1)-3x(2x-1)=0
(2x-1)[1(4x^2+2x+1)-3x]=0*
2x-1=0
x1=½

4x^2+2x+1-3x=
=4x^2-1x+1=0
D=1-16=-15; D<0

Answer: ½

(8x^3-1)=(2x)^3-1^3=(2x-1)((2x)^2+2x+1^2)