

# Учебный проект

# Рисунки в графиках

“В чистом математике живёт  
всегда художник: архитектор  
и даже поэт”.

*Принсгейм*

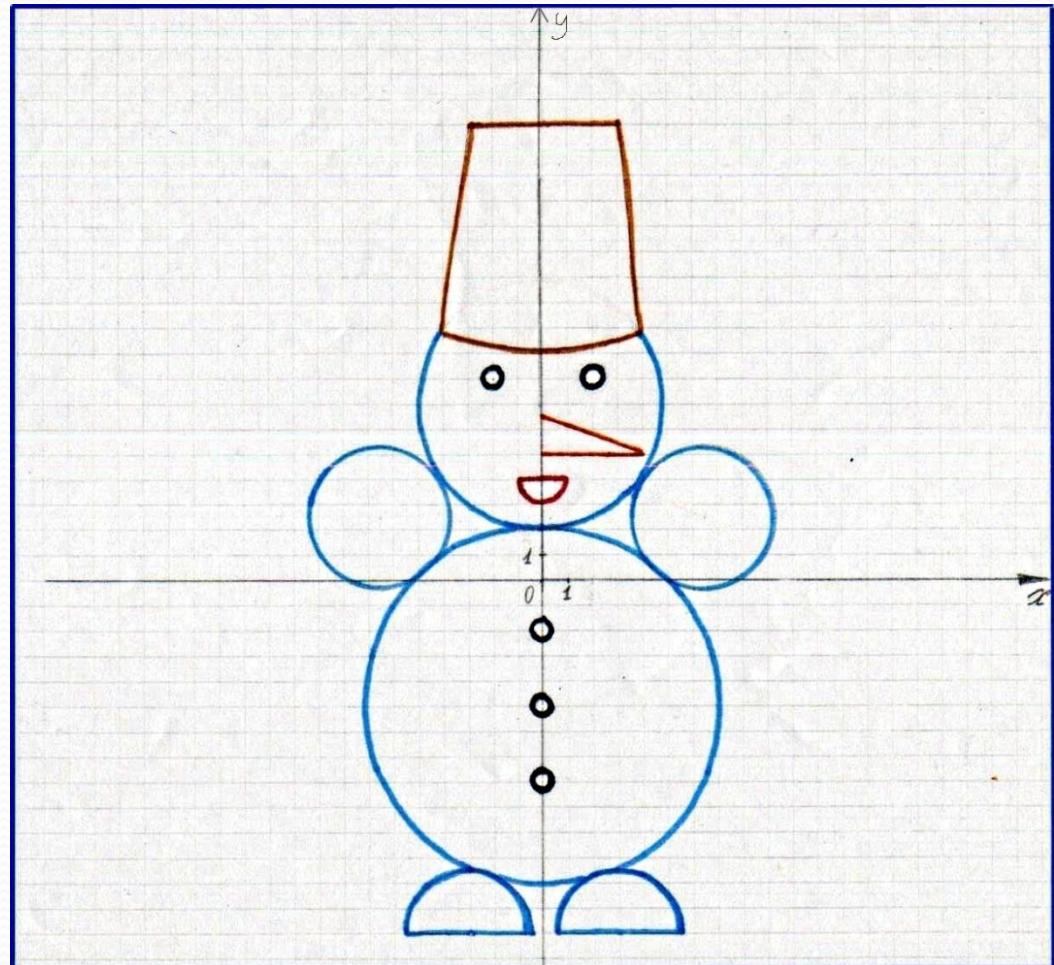
Цель работы: изучить графики функций,  
с их помощью попробовать самому  
построить рисунки.

Выполнил ученик 8 “А” класса МБОУ  
СОШ №159 с углублённым изучением  
математики и физики – Машуков  
Геннадий

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К.

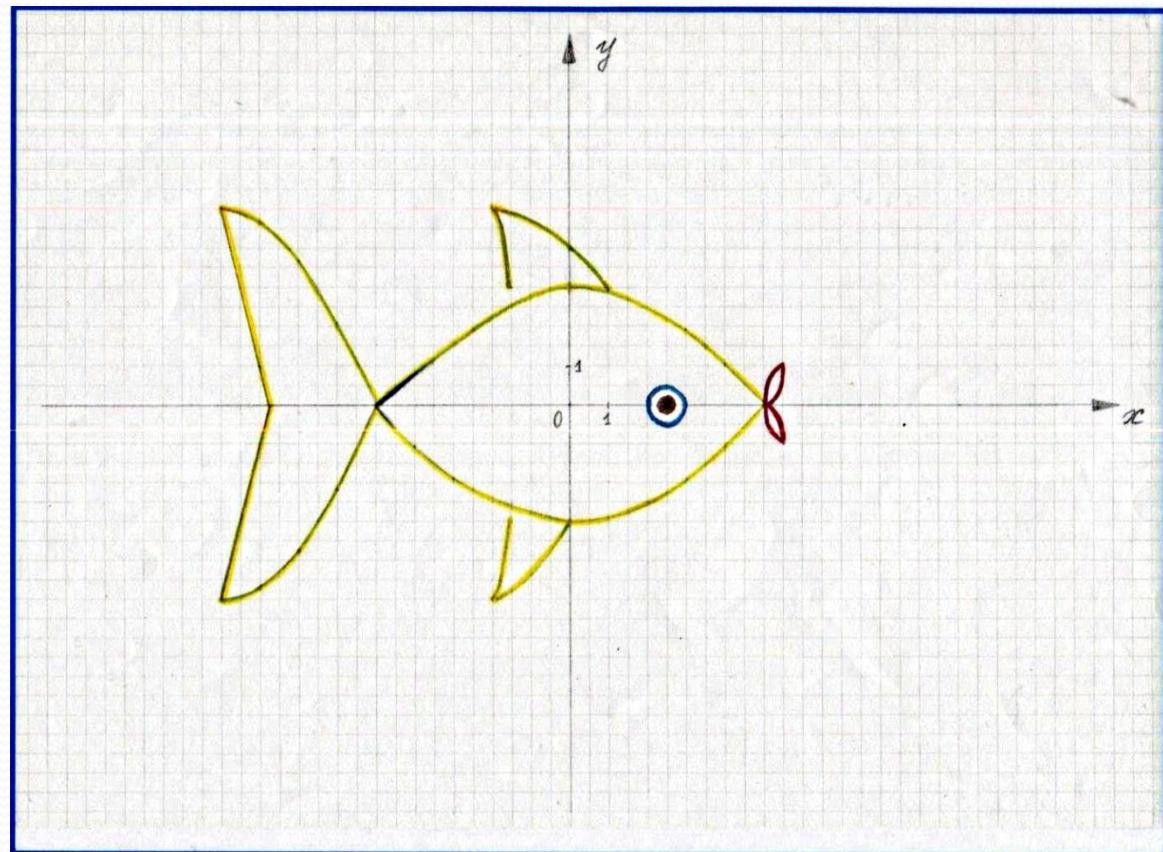
# Снеговик

1.  $x^2 + (y+5)^2 = 49$
2.  $x^2 + (y-7)^2 = 25 \quad y \leq 10$
3.  $x^2 + (y-21)^2 = 144 \quad y \leq 10$
4.  $(x-6,5)^2 + (y-2,5)^2 = 9$
5.  $(x+6,5)^2 + (y-2,5)^2 = 9$
6.  $(x+3)^2 + (y+14)^2 = 6,25 \quad y \geq -14$
7.  $(x-3)^2 + (y+14)^2 = 6,25 \quad y \geq -14$
8.  $x^2 + (y-4)^2 = 1 \quad y \leq 4$
9.  $(x+2)^2 + (y-8)^2 = 0,25$
10.  $(x-2)^2 + (y-8)^2 = 0,25$
11.  $x^2 + (y+2)^2 = 0,25$
12.  $x^2 + (y+5)^2 = 0,25$
13.  $x^2 + (y+8)^2 = 0,25$
14.  $y = -14 \quad x \in [-5,5; -0,5] \cup [0,5; 5,5]$
15.  $y = 4 \quad x \in [-1; 1]$
16.  $y = 5 \quad x \in [0; 4]$
17.  $y = 18 \quad x \in [-3; 3]$
18.  $y = 8x + 42 \quad x \in [-4; -3]$
19.  $y = 8x - 42 \quad x \in [3; 4]$
20.  $y = -0,375x + 6,5 \quad x \in [0; 4]$



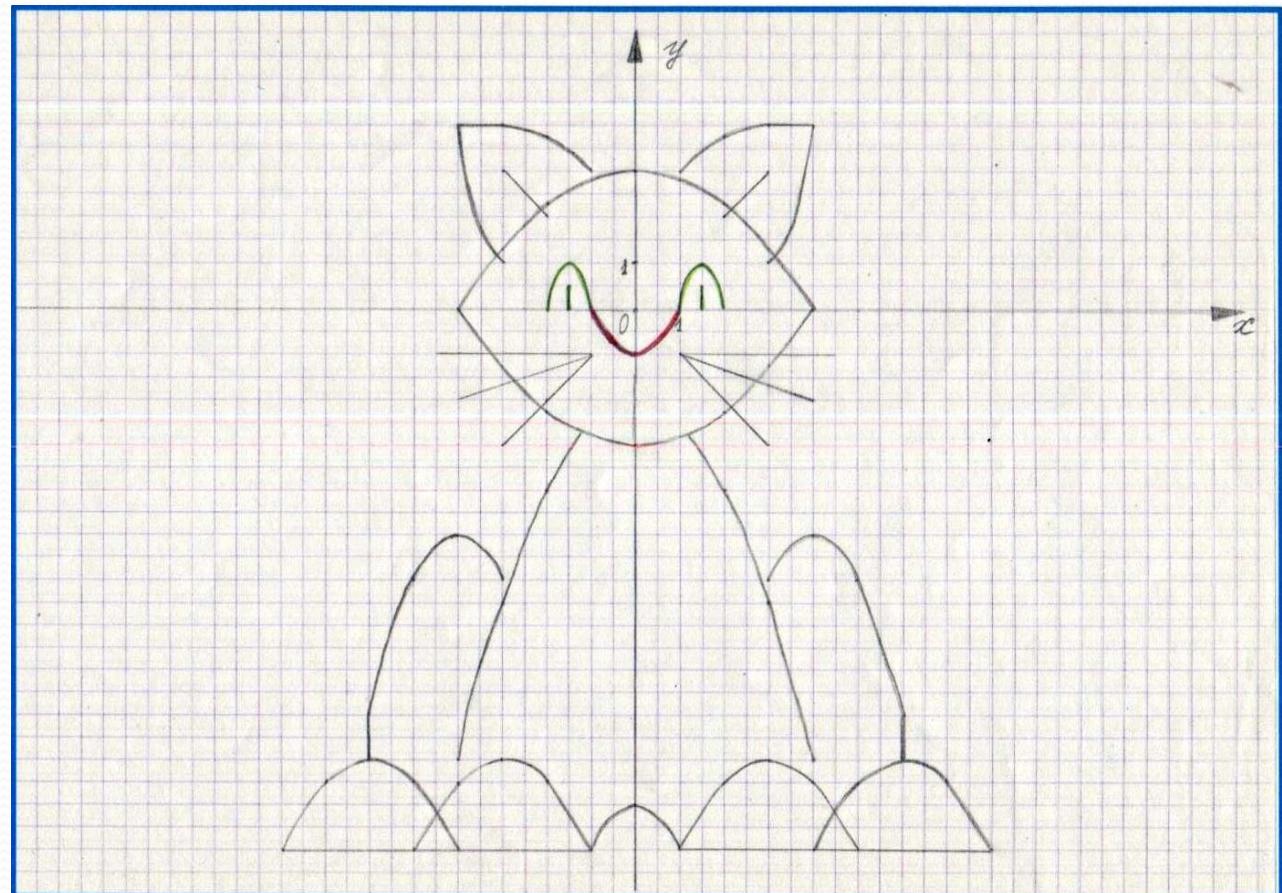
# Рыбка

1.  $y = \frac{3}{25}x^2 - 3$   $x \in [-5; 5]$
2.  $y = -\frac{3}{25}x^2 + 3$   $x \in [-5; 5]$
3.  $y = 8(x+2)^2 - 5$   $x \in [-2; -1,5]$
4.  $y = -8(x+2)^2 + 5$   $x \in [-2; -1,5]$
5.  $y = \frac{1}{2}(x+2)^2 - 5$   $x \in [-2; 0]$
- 6.
- 7.
8.  $y = 4(x-5,5)^2 - 1$   $x \in [5; 5,5]$
9.  $y = 4(x-5)^2$   $x \in [5; 5,5]$
10.  $y = -4(x-5,5)^2 + 1$   $x \in [5; 5,5]$
11.  $y = -4(x-5)^2$   $x \in [5; 5,5]$
12.  $y = \frac{5}{16}(x+9)^2 - 5$   $x \in [-9; -5]$
13.  $y = -\frac{5}{16}(x+9)^2 + 5$   $x \in [-9; -5]$
14.  $y = -4x - 31$   $x \in [-9; -7,75]$
15.  $y = 4x + 31$   $x \in [-9; -7,75]$



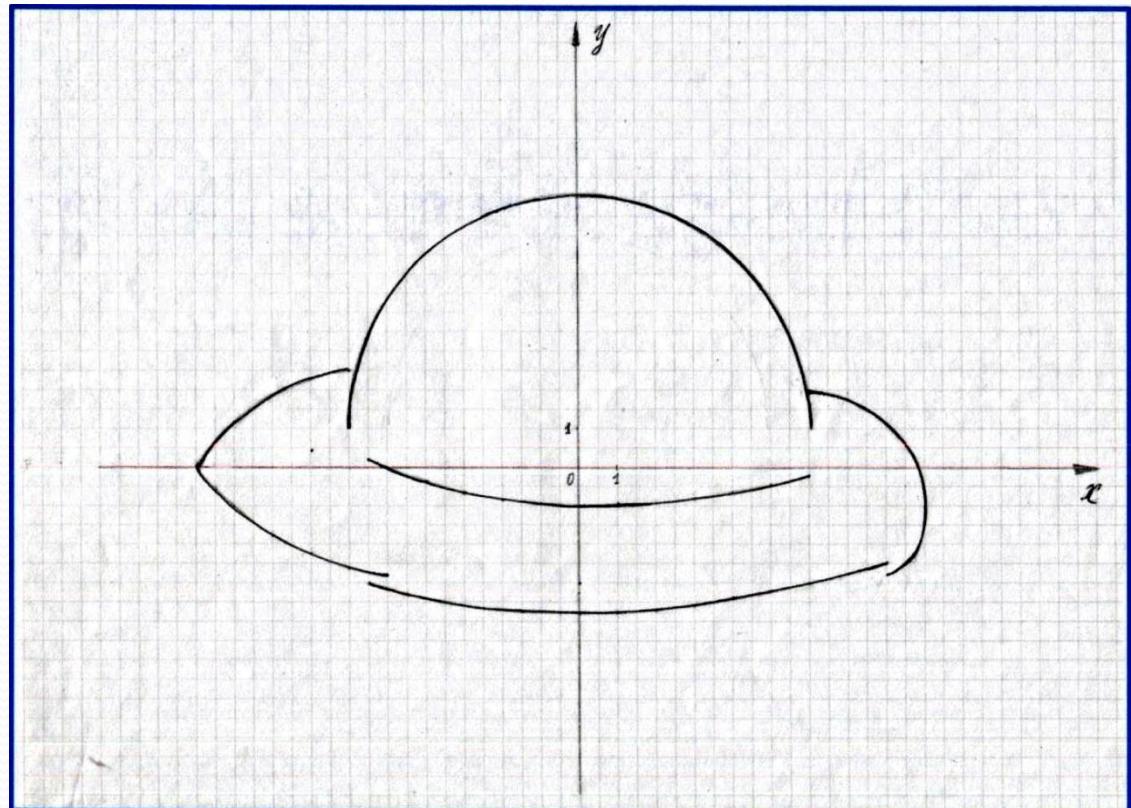
# Кот

1.  $y = -\frac{1}{2}x^2 - 2 \quad x \in [-4; -1,3] \cup [1,3; 4]$
2.  $y = -(x+4)^2 - 5 \quad x \in [-6; -3]$
3.  $y = -(x-4)^2 - 5 \quad x \in [3; 6]$
4.  $x = 6 \quad y \in [-9; -10]$
5.  $x = -6 \quad y \in [-9; -10]$
6.  $y = -\frac{1}{2}(x+6)^2 - 10 \quad x \in [-8; -4]$
7.  $y = -\frac{1}{2}(x-6)^2 - 10 \quad x \in [4; 8]$
8.  $y = -\frac{1}{2}(x+3)^2 - 10 \quad x \in [-5; -1]$
9.  $y = -\frac{1}{2}(x-3)^2 - 10 \quad x \in [1; 5]$
10.  $y = -x^2 - 11 \quad x \in [-1; 1]$
11.  $y = -12 \quad x \in [-8; -1] \cup [1; 8]$
12.  $y = \frac{3}{16}x^2 - 3 \quad x \in [-4; 4]$
13.  $y = -\frac{3}{16}x^2 + 3 \quad x \in [-4; 4]$
14.  $y = x^2 - 1 \quad x \in [-1; 1]$
15.  $y = -4(x+1,5)^2 + 1 \quad x \in [-2; -1]$
16.  $y = -4(x-1,5)^2 + 1 \quad x \in [1; 2]$
17.  $y = 3(x+3)^2 + 1 \quad x \in [-4; -3]$
18.  $y = 3(x-3)^2 + 1 \quad x \in [3; 4]$
19.  $y = -\frac{1}{4}(x+3)^2 + 4 \quad x \in [-3; -1]$
20.  $y = -\frac{1}{4}(x-3)^2 + 4 \quad x \in [1; 3]$
21.  $y = 4 \quad x \in [-4; -3] \cup [3; 4]$
22.  $y = x \quad x \in [-1; -3] \cup [1; 3]$
23.  $y = -x \quad x \in [-3; -2] \cup [1; 3]$
24.  $y = -1 \quad x \in [-4,5; -1] \cup [1; 4,5]$
25.  $y = \frac{1}{3}x - 2/3 \quad x \in [-4; -1]$   
 $y = -\frac{1}{3}x - 2/3 \quad x \in [1; 4]$
26.  $x = -1,5 \quad y \in [0; 0,5]$   
 $x = 1,5 \quad y \in [0; 0,5]$



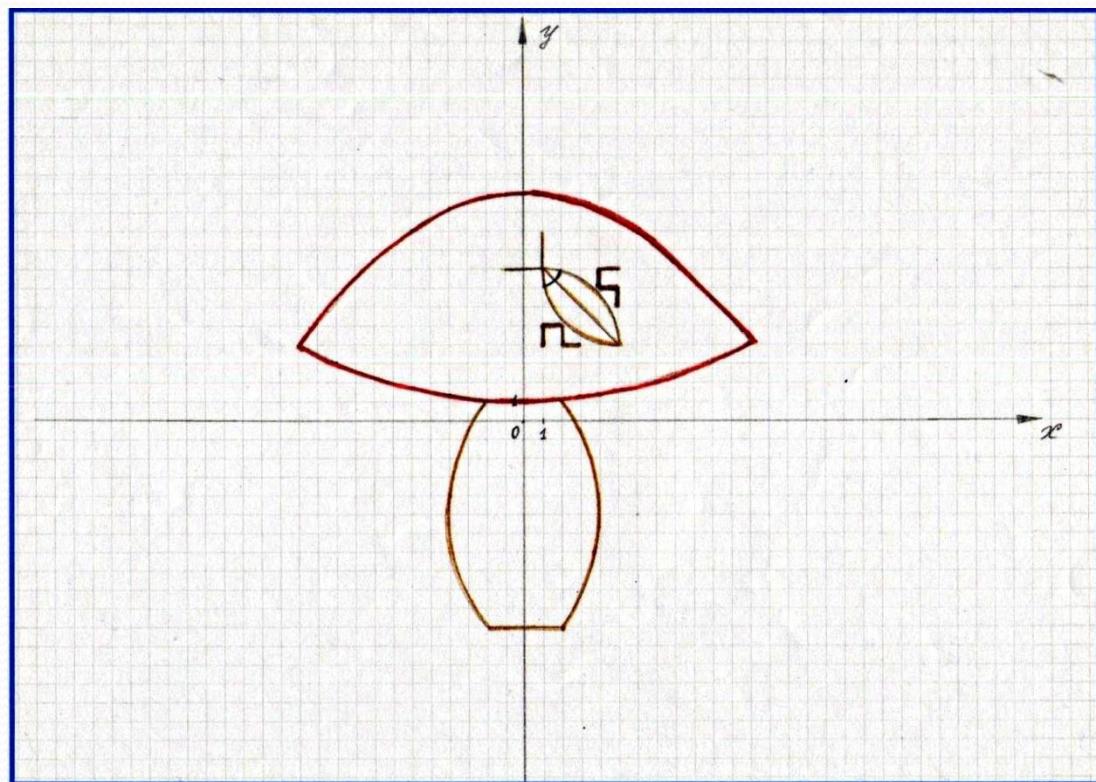
# НЛО

1.  $x^2 + (y-1)^2 = 36 \quad y \geq 1$
2.  $y = 1/25x^2 - 1 \quad x \in [-5,5;0]$
3.  $y = 1/49x^2 - 1 \quad x \in [0;6]$
4.  $y = -5/32(x+6)^2 + 2,5 \quad x \in [-10;-6]$
5.  $y = 14/125(x+5)^2 - 2,8 \quad x \in [-10;-5]$
6.  $(x-6)^2 + (y+1)^2 = 9 \quad x \in [8,7;9]$
7.  $y = -0,23(x-6)^2 + 2 \quad x \in [6;8,75]$
8.  $y = 0,025x^2 - 3,75 \quad x \in [-5,5;0]$
9.  $y = 0,02x^2 - 3,75 \quad x \in [0;8]$
10.  $y = 1/2(x-8)^2 - 2,75 \quad x \in [8;8,75]$



# Гриб

1.  $(x-6)^2 + (y+5)^2 = 100 \quad x \in [-4; -2]$
2.  $(x+6)^2 + (y+5)^2 = 100 \quad x \in [2; 4]$
3.  $y = -11 \quad x \in [-2; 2]$
4.  $y = 1/48x^2 + 1 \quad x \in [-12; 12]$
5.  $y = -1/48x^2 + 12 \quad x \in [-12; 12]$
6.  $y = (x-1)^2 + 7 \quad x \in [1; 2]$
7.  $(x-5)^2 + (y-8)^2 = 16 \quad x \in [1; 5] \quad y \leq 8$
8.  $(x-1)^2 + (y-4)^2 = 16 \quad x \in [1; 5] \quad y \geq 4$
9.  $y = 4 \quad x \in [2; 3]$
10.  $y = 5 \quad x \in [1; 2]$
11.  $y = 7 \quad x \in [4; 5]$
12.  $Y = 8 \quad x \in [4; 5] \cup [-1; 1]$
13.  $x = 1 \quad y \in [4; 5] \cup [8; 10]$
14.  $x = 2 \quad y \in [4; 5]$
15.  $x = 4 \quad y \in [7; 8]$
16.  $x = 5 \quad y \in [6; 7]$
17.  $y = -1x + 9 \quad x \in [1; 5]$



# Рожица

1.  $x^2 + (y+1)^2 = 72,25 \quad x \in [-6;4] \quad y \geq 5$
2.  $(x+0,5)^2 + (y+3)^2 = 4 \quad x \in [-2;0,5] \quad y \geq -1,5$
3.  $(x+8)^2 + y^2 = 2,25 \quad x \in [-9,5;-8]$
4.  $(x-7)^2 + (y-2)^2 = 1 \quad x \in [7;8]$
5.  $(x+7,5)^2 + (y-3,5)^2 = 2,25 \quad x \in [-9;-7,5] \quad y \geq 3,5$
6.  $(x+7)^2 + (y-3)^2 = 2,25 \quad x \in [-8,5;-7] \quad y \geq 3$
7.  $(x-4)^2 + (y-5)^2 = 4 \quad x \in [4,5;6] \quad y \geq 5$
8.  $(x-4,5)^2 + (y-5,5)^2 = 4 \quad x \in [5;6,5] \quad y \geq 6$
9.  $(x+4)^2 + (y+3)^2 = 9 \quad x \in [-5,5;-3] \quad y \geq -0,5$
10.  $(x-3)^2 + (y+2)^2 = 9 \quad x \in [1,5;4] \quad y \geq 0,5$
11.  $y = -4(x+4,5)^2 + 1 \quad x \in [-5;-4]$
12.  $y = -4(x-3)^2 + 2 \quad x \in [2,5;3,5]$
13.  $y = -1,3(x+4,5)^2 + 3 \quad x \in [-6;-3]$
14.  $y = -1,3(x-3)^2 + 4 \quad x \in [1,5;4,5]$
15.  $y = 0,12x^2 - 4,5 \quad x \in [0;3,5]$
16.  $y = 0,16x^2 - 5 \quad x \in [0;3,5]$
17.  $y = -0,3(x-7,5)^2 + 9 \quad x \in [5,5;12]$
18.  $y = -0,3(x-7,5)^2 + 8 \quad x \in [6;11]$
19.  $y = -0,65(x-7,5)^2 + 7 \quad x \in [6,5;11]$
20.  $y = 0,08(x+1,5)^2 - 4,5 \quad x \in [-4;-1,5]$
21.  $y = 1/9(x+1)^2 - 5 \quad x \in [-4;-1]$
22.  $y = -4,5 \quad x \in [-1,5;0]$
23.  $y = -5 \quad x \in [-1;0]$
24.  $y = -0,49(x+9,5)^2 + 8 \quad x \in [-13;-7,5]$
25.  $y = -0,49(x+9,5)^2 + 6 \quad x \in [-13;-8]$
26.  $y = -0,49(x+9,5)^2 + 5 \quad x \in [-1;-7]$

