Analytic geometry – Parabola

The tasks should be solved using iPad or the correct answers can be transferred to the given hyperbola on an interactive board. The hyperbola will be shown by a picture or a central equation. Enter the correct answers into the worksheet tables.

(In case you do not have any ICT available, the assignment can also be found in the attachment to the worksheet.)

For the pictures, it is true that a unit on the Cartesian plane axes equals 1 cm.

Information needed to solve the tasks:

- The vertex equation of a parabola with vertex $V = [m; \, n]$ with parameter p:

$$(x - m)^2 = 2p(y - n) \qquad \text{ev.} \qquad (x - m)^2 = -2p(y - n)$$

$$(y - n)^2 = 2p(x - m) \qquad \text{ev.} \qquad (y - n)^2 = -2p(x - m)$$

- Plotting of the given parabola in the Cartesian plane
- Position of a point relative to the parabola

Task 1:   Match the correct equation, parameter and general equation for the directrix of the parabola with the given hyperbola in the picture.

Picture of the hyperbola	Equation of the hyperbola	Value of the parameter	Equation for the directrix d:
1			
2			
3			
4			
5			
6			

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Task 2:   Match the given parabola with the correct picture and its vertex.

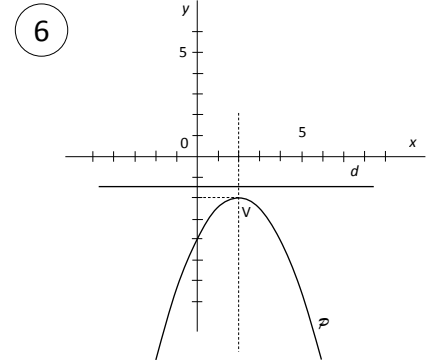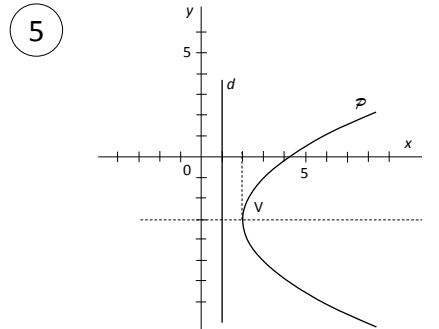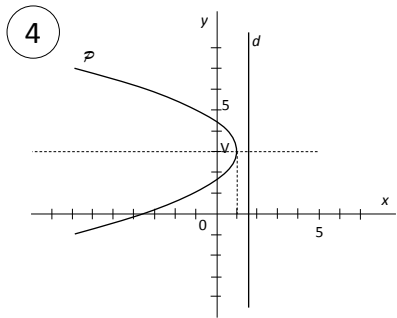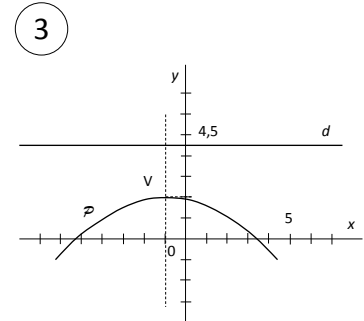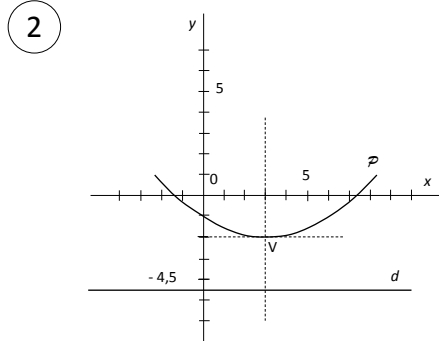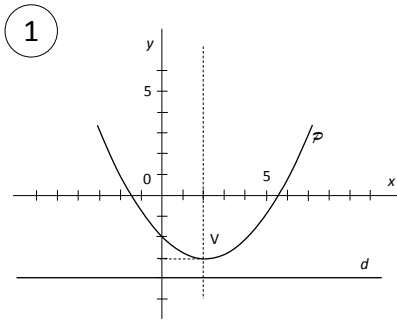| Equation of the parabola	Picture of the parabola	Vertex of the parabola
1		
2		
3		
4		
5		
6		

Task 3:   Find the vertex equation to the given parabola in the picture. Then enter this vertex equation into the frame. Determine the position of points relative to the parabola (an internal point of the parabola, a point on the parabola, external point of the parabola).

Vertex equation of the parabola	

Point	Position of the point
A	
B	
C	
D	
E	
F	

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ASSIGNMENT

Task 1:   Match the correct equation, parameter and general equation for the directrix of the parabola with the given hyperbola in the picture.

①

②

③

④

⑤

⑥

A: $(y + 3)^2 = 4(x - 2)$

B: $(x - 2)^2 = 10(y + 3)$

C: $(x - 2)^2 = -2(y + 2)$

D: $(x - 2)^2 = 4(y + 3)$

E: $(y + 3)^2 = -4(x - 2)$

F: $(x - 3)^2 = 10(y + 2)$

G: $(x + 1)^2 = 10(y - 2)$

H: $(y - 3)^2 = -2(x - 1)$

I: $(x + 1)^2 = -10(y - 2)$

J: $(x - 1)^2 = 2(y - 3)$

$$p = 1\ cm \quad p = 2\ cm \quad p = 3\ cm \quad p = 4\ cm \quad p = 5\ cm$$

$d: 2x - 3 = 0 \quad d: 2x + 3 = 0 \quad d: 2x + 9 = 0 \quad d: 2x - 9 = 0 \quad d: x - 1 = 0 \quad d: x - 1 = 0$

$d: 2y - 3 = 0 \quad d: 2y + 3 = 0 \quad d: 2y + 9 = 0 \quad d: 2y - 9 = 0 \quad d: y - 4 = 0 \quad d: y + 4 = 0$

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ASSIGNMENT

Task 2: Match the given parabola with the correct picture and its vertex.

1: $(x-3)^2 = 4(y-2)$

2: $(y-2)^2 = 2(x+2)$

3: $(y-3)^2 = -4(x-1)$

4: $(x-1)^2 = -10(y+2)$

5: $(y-3)^2 = 10(x+1)$

6: $(x-2)^2 = 4(y+2)$

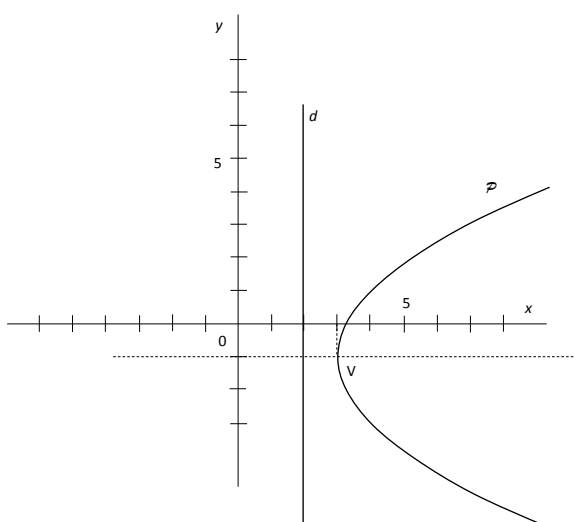$U[1; -2]$ $V[2; -2]$ $W[1; 3]$ $X[3; 2]$ $Y[-1; 3]$ $Z[-2; 2]$

A

B

C

D

E

F

G

H

I
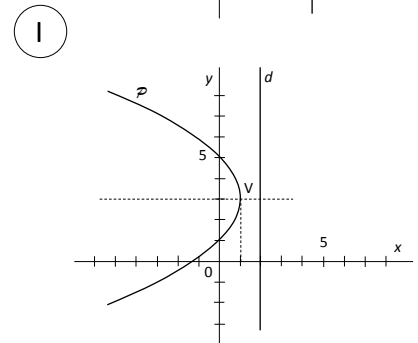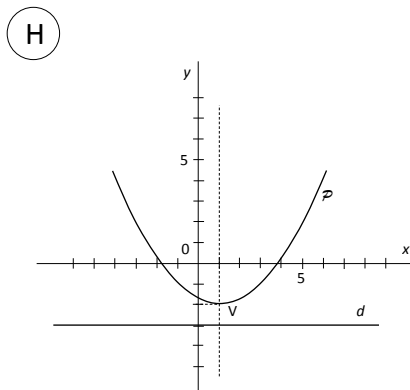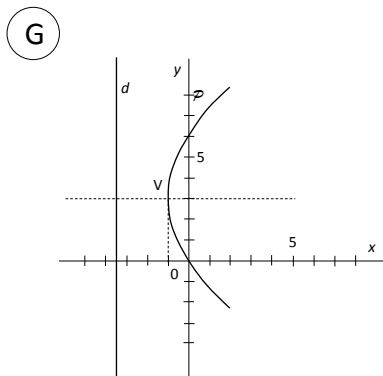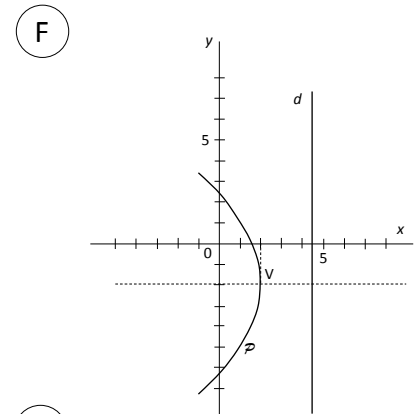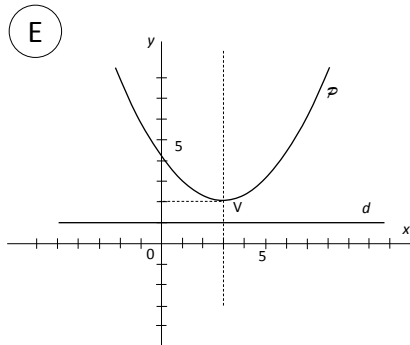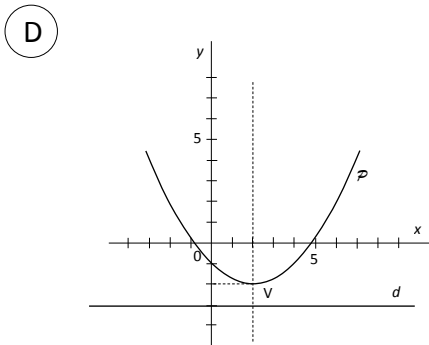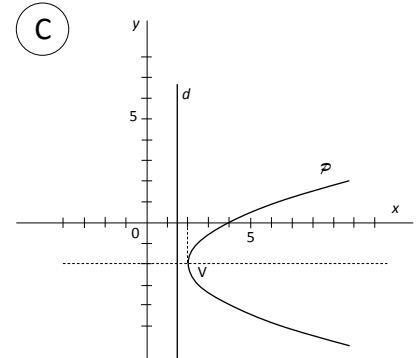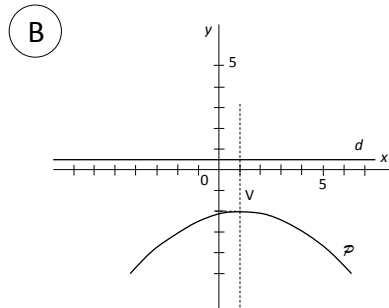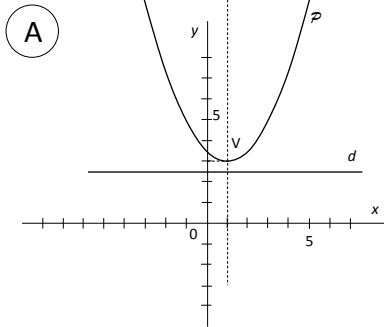
ASSIGNMENT

Task 3:   Find the vertex equation to the given parabola in the picture. Then enter this vertex equation into the frame. Determine the position of points relative to the parabola (an internal point of the parabola, a point on the parabola, external point of the parabola).

$A[5; -2]$ $B[4; 2]$ $C[7; 3]$ $D[4; -9]$ $E[3; -2]$ $F[9; -7]$