

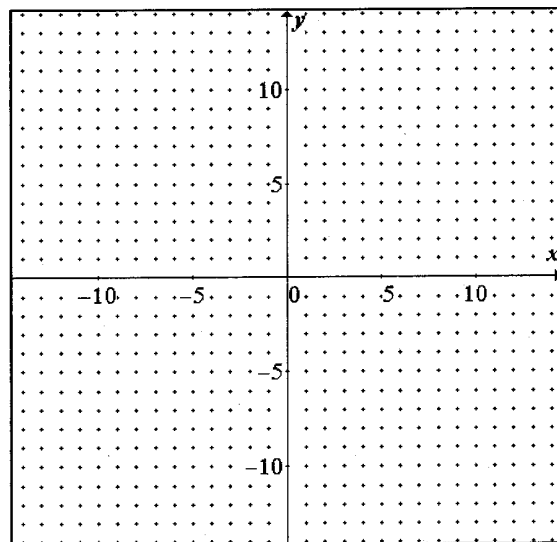
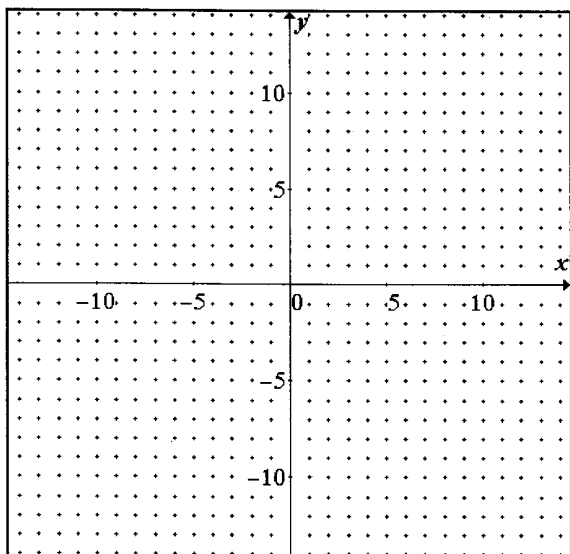
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Part 4

1. Using the graphing calculator, sketch each of the following on the same set of axes.

a) $y = x^2$ $y = (x-5)^2$ $y = (x-5)^2 + 5$

b) $y = x^2$ $y = (x+2)^2$ $y = (x+2)^2 - 4$

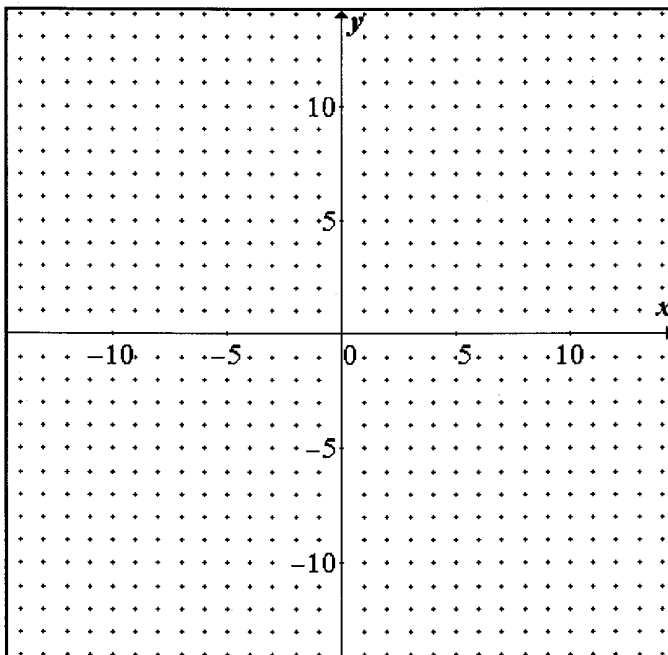


2. Complete the following table:

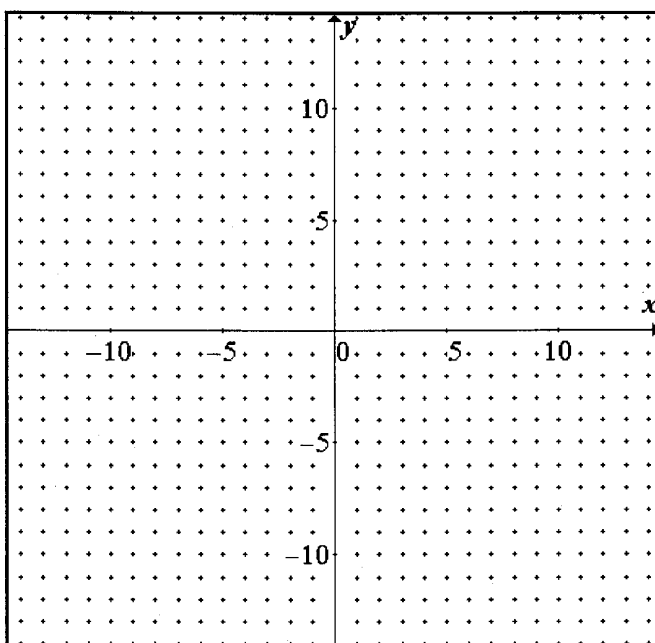
Equation	vertex	axis of symmetry
$y = x^2$		
$y = (x-5)^2$		
$y = (x-5)^2 + 5$		
$y = x^2$		
$y = (x+2)^2$		
$y = (x+2)^2 - 4$		

3. Using the graphing calculator, sketch the following sets on the same set of axes.

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



b) $y = (x-3)^2 + 4$ $y = (x-1)^2 + 4$ $y = (x+2)^2 + 4$ $y = (x+5)^2 + 4$



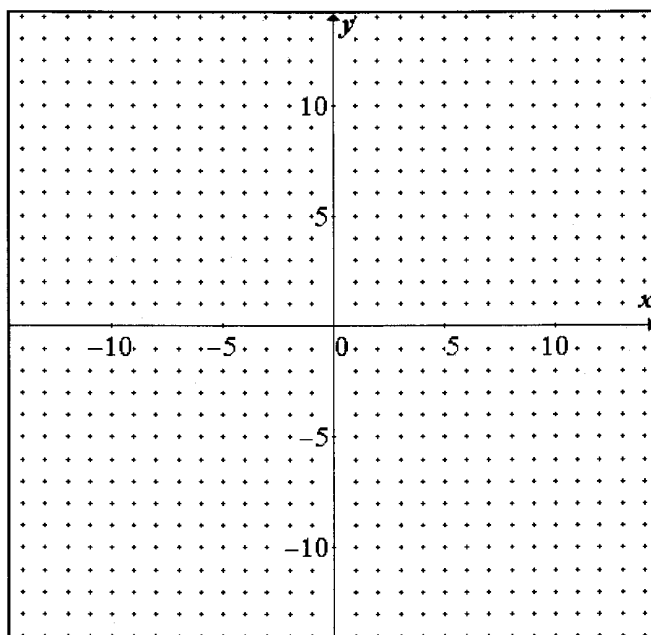
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c) $y = (x-2)^2 + 4$

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

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

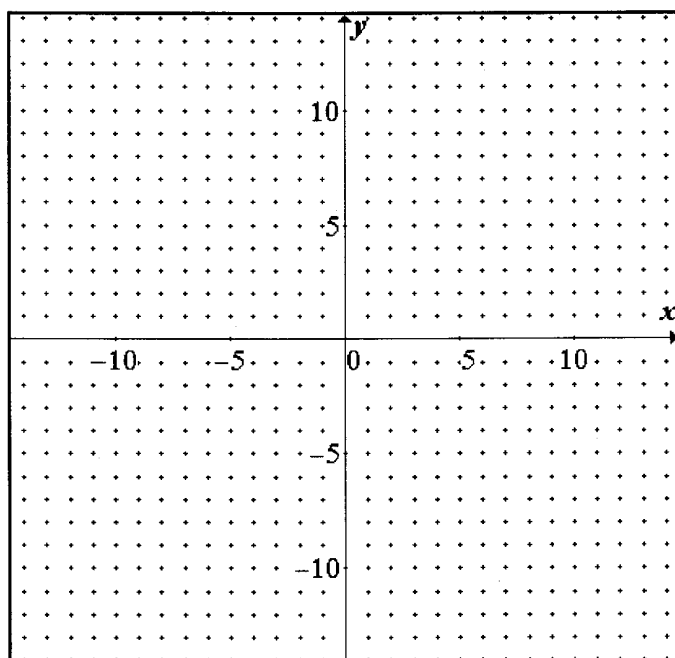
$y = -3(x-2)^2 + 4$



d) $y = (x+2)^2 - 3$

$y = \frac{1}{2}(x+2)^2 - 3$

$y = -\frac{1}{2}(x+2)^2 - 3$



4. Complete the chart:

Equation	vertex	Axis of symmetry	Direction of opening
$y = (x-3)^2$			
$y = (x-3)^2 - 2$			
$y = (x-3)^2 + 4$			
$y = (x-3)^2 - 4$			
$y = (x-3)^2 + 4$			
$y = (x-1)^2 + 4$			
$y = (x+2)^2 + 4$			
$y = (x+5)^2 + 4$			
$y = (x-2)^2 + 4$			
$y = 3(x-2)^2 + 4$			
$y = -(x-2)^2 + 4$			
$y = -3(x-2)^2 + 4$			
$y = (x+2)^2 - 3$			
$y = \frac{1}{2}(x+2)^2 - 3$			
$y = -\frac{1}{2}(x+2)^2 - 3$			

5. In comparing the graph of $y = 2(x-4)^2 + 5$ to the graph of $y = x^2$, explain:

a) what change is caused by the '5'?

b) what change is caused by the '4'?

c) what change is caused by the '2'?

6. Given the relation $y = 2(x - 4)^2 + 5$

a) what is the vertex of the parabola? _____

b) does the graph open upwards or downwards? _____

c) is the vertex a maximum or minimum point? _____

The equation $y = a(x - p)^2 + q$ is called the **vertex form** of the parabola.

7. Given the relation $y = a(x - p)^2 + q$

a) what change is caused by the 'q'?

b) what change is caused by the 'p'?

c) what change is caused by the 'a'?

8. Given the relation $y = a(x - p)^2 + q$

a) what is the vertex of the parabola? _____

b) does the graph open upwards or downwards? _____

c) is the vertex a maximum or minimum point? _____

9. Write the corresponding defining equation for the quadratic relation with the given values.

a	vertex	equation
2	(1,3)	
2	(1,-3)	
2	(-1,3)	
2	(-1,-3)	
-2	(1,3)	
$-\frac{1}{2}$	(-4,7)	

10. For each of the following:

- create the general equation in vertex form.
- use the given point to determine the value of 'a'.
- write the defining equation.

(i) vertex (3,5)

point on parabola (1,-3)

(ii) vertex (-1,-7)

point on parabola (0,-3)

(iii) vertex (2,-5)

point on parabola (4,-7)

(iv) vertex (4,1)

point on parabola (1,7)