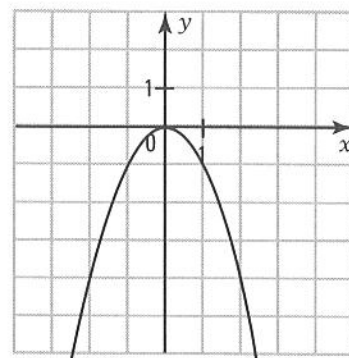


b) Consider the quadratic function $y = -x^2$ and the function $f(x) = ax^2$ ($a < 0$).

1. Represent function f when

1) $a = -\frac{1}{4}$. 2) $a = -\frac{1}{2}$. 3) $a = -2$.

2. As the absolute value of parameter a increases, do you observe a vertical stretch or reduction?



c) Consider the parabola with equation $y = ax^2$.

Is the parabola open upward or downward when

1. $a > 0$? _____ 2. $a < 0$? _____

ACTIVITY 4 Interpretation of parameter a

A real estate agent sells square-shaped lots. The cost of each lot is \$10 per m^2 .

a) Find the rule of the function f which associates the measure x of the side with the cost y of the lot. _____

b) The rule of the function is of the form $y = ax^2$.

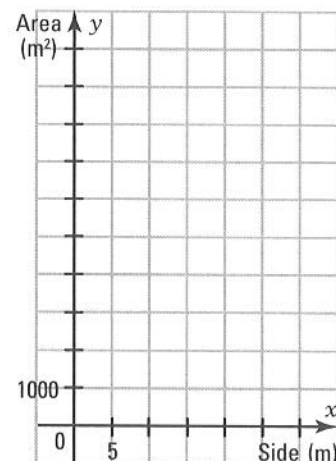
1. Identify parameter a . _____

2. Interpret parameter a in this situation.

We say that the cost y is **directly proportional** to the square of the side length x .

c) Complete the table of values of function f .

x	0	10	15	20	30
y					

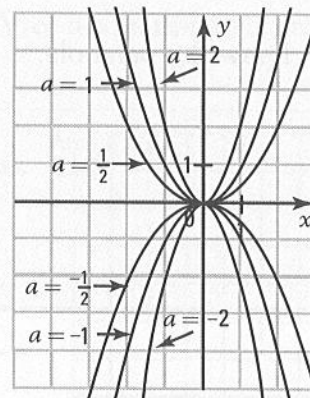


d) Represent function f in the Cartesian plane on the right.

ROLE OF PARAMETER a

Consider the parabola with equation $y = ax^2$ and vertex $V(0, 0)$.

- The sign of a determines whether the parabola is open upward or downward.
 - $a > 0$: the parabola is open upward.
 - $a < 0$: the parabola is open downward.
- The absolute value of a influences the opening of the parabola. As the absolute value of a increases, we observe a vertical stretch of the parabola.



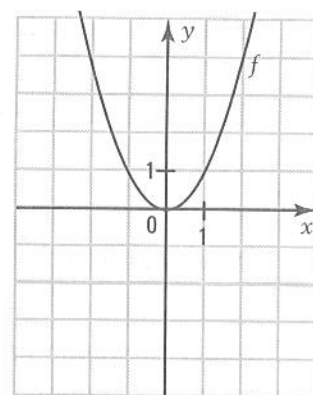
2. The graph of the function $f(x) = x^2$ is drawn on the right. Deduce the graph of

a) $g(x) = \frac{1}{4}x^2$.

b) $h(x) = \frac{3}{2}x^2$.

c) $i(x) = -x^2$.

d) $j(x) = -2x^2$.



ACTIVITY 5 Graphing a parabola

Consider the function $f(x) = -2x^2$.

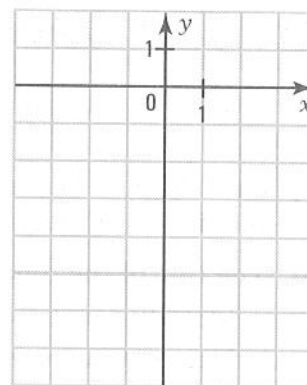
a) Is the parabola open upward or downward? Justify your answer.

b) Determine the coordinates of the vertex. _____

c) Complete the table of values below.

x	-2	-1	0	1	2
$y = -2x^2$					

d) Draw the parabola in the Cartesian plane on the right.



GRAPHING THE PARABOLA $y = ax^2$

Procedure

Ex.: $y = \frac{1}{2}x^2$

1. Determine the opening according to the sign of a .

1. Open upward since $a > 0$.

2. Determine the coordinates of the vertex.

2. $V(0, 0)$

3. Complete a table of values.

3.

x	-3	-2	-1	0	1	2	3
$y = \frac{1}{2}x^2$	4.5	2	0.5	0	0.5	2	4.5

4. Draw the parabola.

4.

