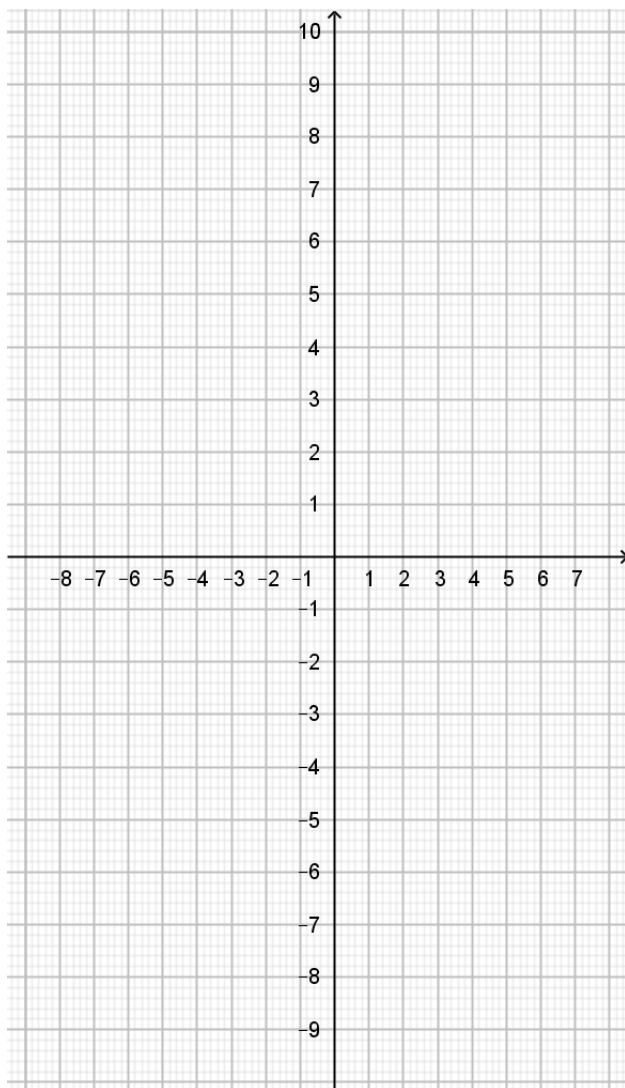


Quadratic monomials - quadratic functions of the form $y = ax^2$

Task 1. Fill in missing cells in the table below with the values of the function given in the table for the given arguments. Draw all the functions in one coordinate plan.

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

Task 2. Draw graphs of the functions $y = x^2$, $y = 2x^2$, $y = 3x^2$, $y = \frac{1}{2}x^2$, $y = \frac{1}{3}x^2$ in coordinate plane. Make sure that each graph has a different colour and a label with appropriate formula. Describe properties of these functions.

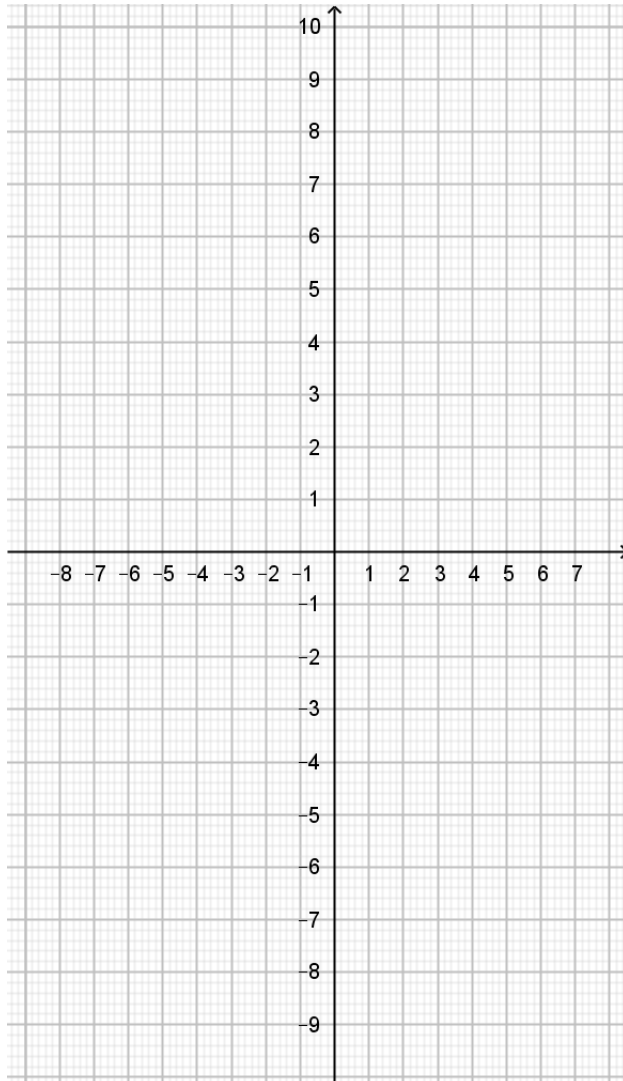


Properties

1. The domain of all functions is $D = \dots\dots\dots$
2. The range of all functions is $W = \dots\dots\dots$
3. All the graphs pass through the point
.....
4. All graphs have a line of symmetry which
....-axis. (x -axis or y -axis?)
5. All functions decrease in the interval
.....
6. All functions increase in the interval
.....
7. All functions have the lowest point
8. The functions are
(monotonic or not monotonic?)
9. The smaller coefficient the
the graph opens.
(wider or narrower?)
10. All the graphs are parabolas with the
vertex
11. The branches of all parabolas are
directed
(upwards or downwards?)

Task 3. Draw graphs of the functions $y = -x^2$, $y = -2x^2$, $y = -3x^2$, $y = -\frac{1}{2}x^2$, $y = -\frac{1}{3}x^2$ in coordinate plane. Make sure that each graph has a different colour and a label with appropriate formula. Describe properties of these functions.

Properties



1. The domain of all functions is $D = \dots\dots\dots$
2. The range of all functions is $W = \dots\dots\dots$
3. All the graphs pass through the point
.....
4. All graphs have a line of symmetry which
....-axis . (x -axis or y -axis ?)
5. All functions decrease in the interval
.....
6. All functions increase in the interval
.....
7. All functions have the highest point
.....
8. The functions are
(monotonic or not monotonic?)
9. The smaller coefficient the
the graph opens.
(wider or narrower?)
10. All the graphs are parabolas with the
vertex
11. The branches of all parabolas are
directed
(upwards or downwards?)

Note: A quadratic functions of the form $y = ax^2$ is also called a **monomial** with a variable x and a coefficient a .

English	Polish
quadratic function	funkcja kwadratowa
domain	dziedzina
range	zbiór wartości
argument / input	argument funkcji
value / output / image	wartość funkcji
graph	wykres
formula	wzór
appropriate	właściwy
y-axis	oś y
line of symmetry	oś symetrii
interval	przedział
to increase	rosnąć
to decrease	maleć
monotonic function	funkcja monotoniczna
monotonicity of a function	monotoniczność funkcji
branches of a parabola	gałęzie paraboli
parabola with upwards branches	parabola gałęziami w górę
parabola with downwards branches	parabola gałęziami w dół
coefficient	współczynnik
variable	zmienna
The coefficient of the monomial $y = ax^2$ is a .	Współczynnikiem jednomianu $y = ax^2$ jest a .
The coefficient of the monomial $y = 2x^2$ is $a = 2$.	Współczynnikiem jednomianu $y = 2x^2$ jest $a = 2$.
monomial	jednomian