

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

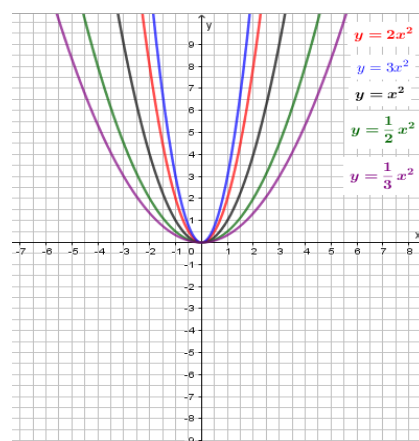
**Task 1.** Fill in missing cells in the table below with the values of the function given in the table for the given arguments. Draw all the functions in one coordinate plan.

$x$	-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
$y = x^2$	9	$6\frac{1}{4}$	4	$2\frac{1}{4}$	1	$\frac{1}{4}$	0	$\frac{1}{4}$	1	$2\frac{1}{4}$	4	$6\frac{1}{4}$	9
$y = 2x^2$	18	$12\frac{1}{2}$	8	$4\frac{1}{2}$	2	$\frac{1}{2}$	0	$\frac{1}{2}$	2	$4\frac{1}{2}$	8	$12\frac{1}{2}$	18
$y = 3x^2$	27	$18\frac{3}{4}$	12	$6\frac{3}{4}$	3	$\frac{3}{4}$	0	$\frac{3}{4}$	3	$6\frac{3}{4}$	12	$18\frac{3}{4}$	27
$y = \frac{1}{2}x^2$	$4\frac{1}{2}$	$3\frac{1}{8}$	2	$1\frac{1}{8}$	$\frac{1}{2}$	$\frac{1}{8}$	0	$\frac{1}{8}$	$\frac{1}{2}$	$1\frac{1}{8}$	2	$3\frac{1}{8}$	$4\frac{1}{2}$
$y = \frac{1}{3}x^2$	3	$2\frac{1}{12}$	$1\frac{1}{3}$	$\frac{3}{4}$	$\frac{1}{3}$	$\frac{1}{12}$	0	$\frac{1}{12}$	$\frac{1}{3}$	$\frac{3}{4}$	$1\frac{1}{3}$	$2\frac{1}{12}$	3

**Task2.** 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  $D = \mathbf{R}$ .
2. The range of all functions is  $\mathbf{(0, \infty)}$ .
3. All the graphs pass through the point  $\mathbf{(0, 0)}$ .
4. All graphs have a line of symmetry which  $\mathbf{y}$ -axis.
5. All functions function decrease in the interval  $\mathbf{(-\infty, 0)}$ .
6. All functions increase in the interval  $\mathbf{(0, \infty)}$ .
7. All functions have the lowest point  $\mathbf{(0, 0)}$ .
8. The functions are **not monotonic**.
9. The smaller coefficient the **wider** the graph opens.
10. All the graphs are parabolas with the vertex  $\mathbf{(0, 0)}$ .
11. The branches of all parabolas are directed **upwards**.



**Task 3.** Draw graphs of the functions given in the task 1 in coordinate plane. Make sure that each graph has a different colour and that a function has its labelled with added its formula.

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3. All the graphs pass through the point  $\mathbf{(0, 0)}$ .
4. All graphs have a line of symmetry which  $\mathbf{y}$ -axis.
5. All functions function decrease in the interval  $\mathbf{(0, \infty)}$ .
6. All functions increase in the interval  $\mathbf{(-\infty, 0)}$ .
7. All functions have the highest point  $\mathbf{(0, 0)}$ .
8. The functions are **not monotonic**.
9. The smaller absolute value of a coefficient the **narrower** the graph opens.
10. All the graphs are parabolas with the vertex  $\mathbf{(0, 0)}$ .
11. The branches of all parabolas are directed **downwards**.

