

Algebra 1 - Graphing Quadratic Functions and Transformations - Worksheet

Common Core F-IF.C.7a, F-IF.C.8a, F-BF.B.3, A-SSE.B.3b · maths-pdf.fr/en/

Name: _____ Class: _____ Date: ____/____/____

This worksheet has 20 problems on graphing quadratic functions and transformations, aligned to Common Core F-IF.C.7a, F-IF.C.8a, F-BF.B.3, and A-SSE.B.3b. You will find the vertex, axis, and intercepts of parabolas, write vertex form, describe transformations, and solve maximum and minimum problems. Early problems check one skill at a time; the final six put the skill inside real situations. Write each step on paper before you look at the answer key.

Algebra 1 · Common Core State Standards: **F-IF.C.7a, F-IF.C.8a, F-BF.B.3, A-SSE.B.3b**

Exercise 1 - Read vertex form

Identify the vertex, the axis of symmetry, and the direction of opening of $y = (x-2)^2 + 3$.

Exercise 2 - Negative leading coefficient

Identify the vertex, axis, direction, and the maximum or minimum value of $y = -2(x+1)^2 + 5$.

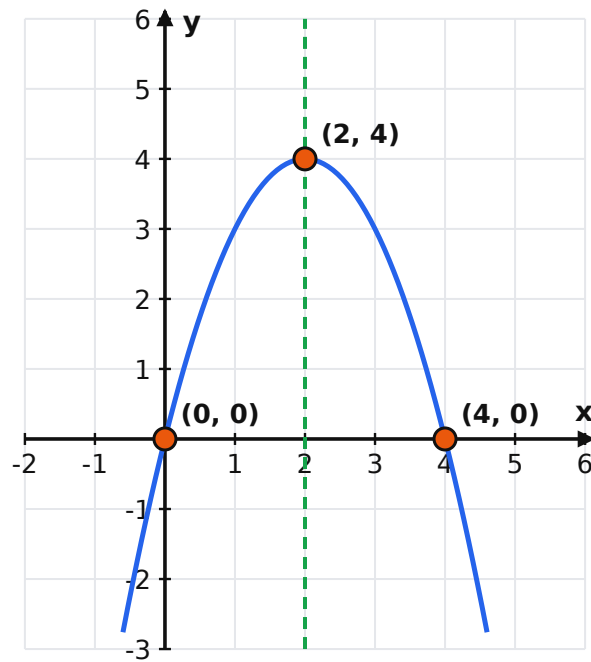
Exercise 3 - Graph a quadratic

Graph $y = x^2 - 4x + 3$. Label the vertex, intercepts, and axis of symmetry.

Exercise 4 - Vertex from standard form

Find the axis of symmetry and the vertex of $y = x^2 + 6x + 5$.

Exercise 5 - Zeros and vertex



A downward-opening parabola.

Find the zeros and the vertex of $y = -x^2 + 4x$.

Exercise 6 - Intercepts

Find the y-intercept and the x-intercepts of $y = x^2 - 2x - 8$.

Exercise 7 - Shift up

Describe how the graph of $y = x^2 + 3$ is related to the graph of $y = x^2$.

Exercise 8 - Shift right

Describe how the graph of $y = (x - 4)^2$ is related to $y = x^2$.

Exercise 9 - Stretch and reflect

Describe how the graphs of $y = -x^2$, $y = 3x^2$, and $y = \frac{1}{2}x^2$ compare with $y = x^2$.

Exercise 10 - Write a transformation

Write the equation of the parabola obtained by shifting $y = x^2$ left 2 units and down 5 units.

Exercise 11 - Complete the square

Write $y = x^2 + 6x + 5$ in vertex form.

Exercise 12 - Vertex form with a harder constant

Write $y = x^2 - 8x + 10$ in vertex form and state the vertex.

Exercise 13 - Compare minimum values

Function $f(x) = (x-3)^2 + 2$ and function $g(x) = x^2 + 4x + 1$. Which has the greater minimum value?

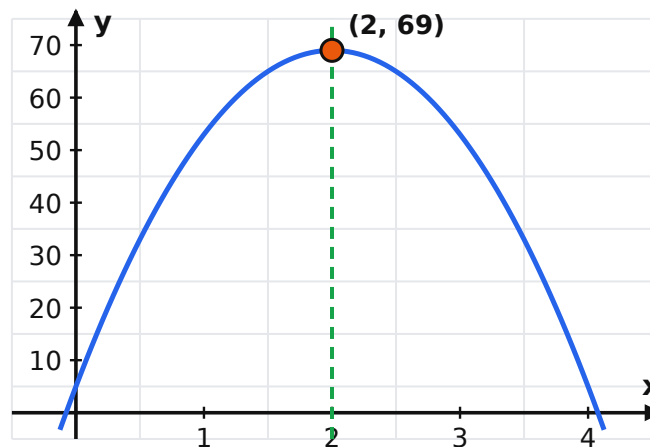
Exercise 14 - Domain and range

State the domain and range of $y = -x^2 + 6x - 5$.

Exercise 15 - Symmetric points

For $f(x) = x^2 - 6x + 8$, find $f(1)$ and $f(5)$. What do the results suggest about the axis of symmetry?

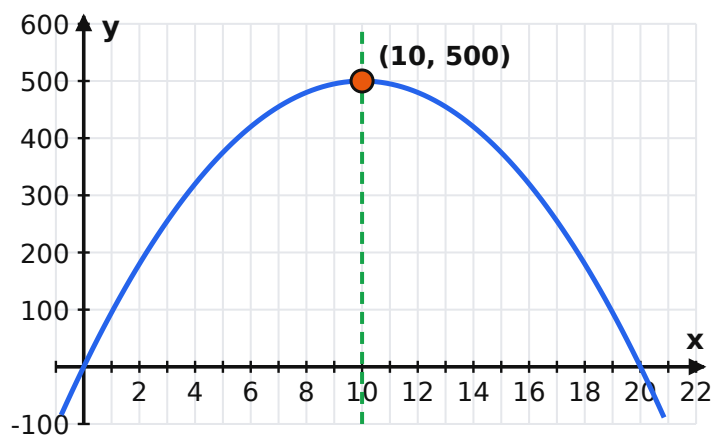
Exercise 16 - Ball height



Height of a ball in feet.

A ball's height in feet after t seconds is $h = -16t^2 + 64t + 5$. Find the time of the maximum height and the maximum height.

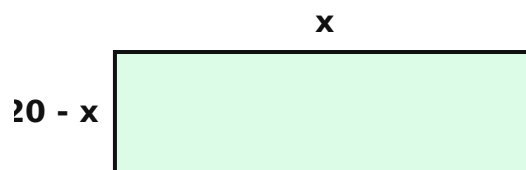
Exercise 17 - Maximum revenue



Revenue in dollars at price p .

A shop's revenue is $R = -5p^2 + 100p$ dollars when the price is p dollars. Find the price that gives the maximum revenue and the maximum revenue.

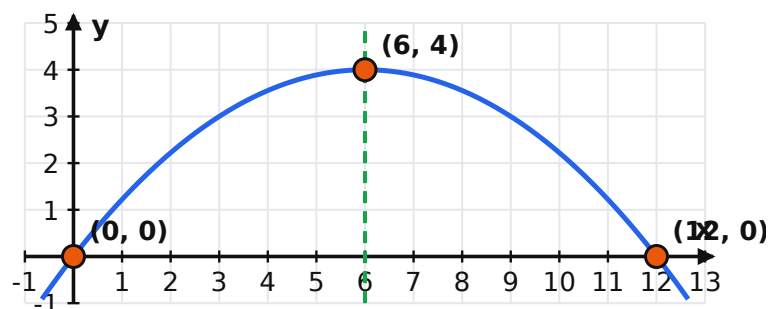
Exercise 18 - Fence for a pen



A pen with perimeter 40 feet.

A farmer has 40 feet of fence for a rectangular pen. If one side is x feet, the other side is $20 - x$ feet, so the area is $A = x(20 - x)$. Find the side that gives the greatest area and that area.

Exercise 19 - Arch



The arch.

An arch is modeled by $y = -\frac{1}{9}(x-6)^2 + 4$ (feet). Find the greatest height and where the arch

meets the ground.

Exercise 20 - Maximum profit

Items x	11	12	13	14
Profit P	208	212	212	208

Profit near the vertex.

A store's profit is $P = -2x^2 + 50x - 100$ dollars for x items. The vertex is at $x = 12.5$. For whole numbers of items, find the maximum profit.

Exercise 21 - Describe all the changes

Describe how $g(x) = -2(x-1)^2 + 3$ is obtained from $f(x) = x^2$, and give its vertex.