

Algebra 2 - Systems of Linear and Quadratic Equations - Worksheet

Common Core A-REI.C.7 · maths-pdf.fr/en/

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

These 20 problems practice systems of linear and quadratic equations (Common Core A-REI.C.7). The first problems check checking points and solving by substitution, the middle problems add tangent lines, circles, and counting intersections with the discriminant, and the last six are word problems and multi-step tasks that need break-even, ball and ramp, and number problems.

Work in order and show every step. Write each answer in simplest form, and open the answer key only after you have tried the problem yourself.

Algebra 2 · Common Core State Standards: **A-REI.C.7**

Exercise 1 - Check a point

Is $(2,5)$ a solution of the system $y = x^2 + 1$ and $y = 3x - 1$?

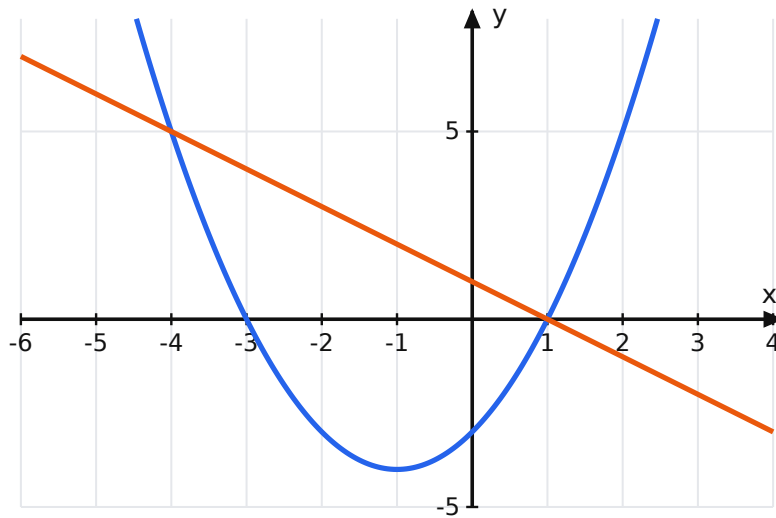
Exercise 2 - Substitution

Solve the system $y = x^2$ and $y = x + 6$.

Exercise 3 - Parabola and line

Solve: $y = x^2 - 4x + 3$ and $y = x - 1$.

Exercise 4 - Read the graph



Two curves.

The system $y = x^2 + 2x - 3$ and $y = -x + 1$ is graphed. Estimate the intersection points from the graph, then solve algebraically to confirm.

Exercise 5 - Tangent line

Solve: $y = x^2 + 1$ and $y = 2x$. How is the line related to the parabola?

Exercise 6 - No real solution

Solve $y = x^2 + 3$ and $y = 2x$.

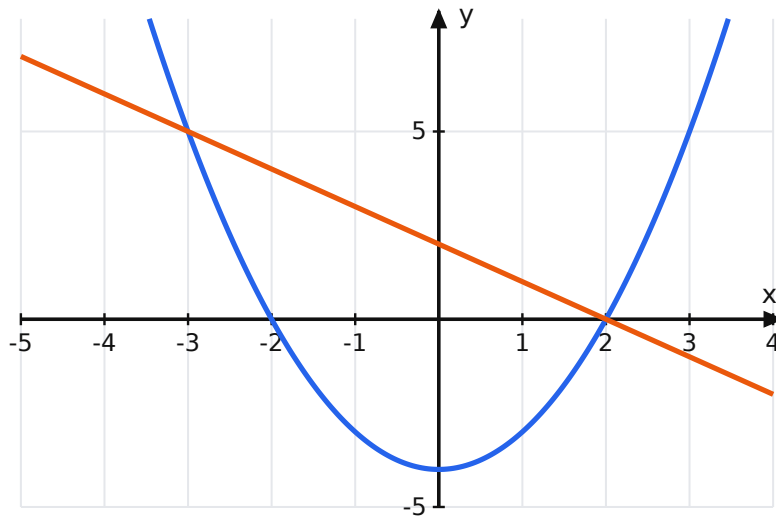
Exercise 7 - Line in standard form

Solve $x + y = 5$ and $y = x^2 - 1$.

Exercise 8 - Irrational solutions

Solve $y = 2x^2 - 3x - 5$ and $y = x + 3$.

Exercise 9 - Solve and graph



Parabola and line.

Solve $y = x^2 - 4$ and $y = -x + 2$, and mark the solutions on a sketch.

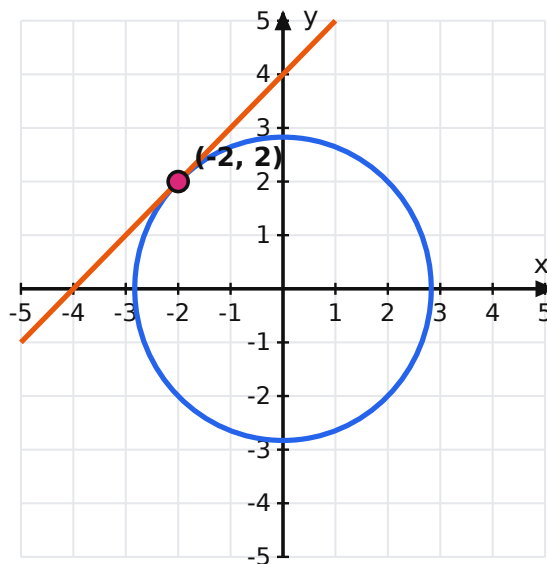
Exercise 10 - Circle and line

Solve $x^2 + y^2 = 25$ and $y = x + 1$.

Exercise 11 - Circle and line through the origin

Solve $x^2 + y^2 = 10$ and $y = 3x$.

Exercise 12 - Tangent to a circle



Circle and line.

Show that the line $y = x + 4$ is tangent to the circle $x^2 + y^2 = 8$ and find the point of tangency.

Exercise 13 - Count the intersections

System	D	Points
$y = x^2, y = 4x - 4$	?	?
$y = x^2, y = 2x - 5$	?	?
$y = x^2, y = x + 2$	?	?

Fill in the table.

Use the discriminant of the quadratic you get after substitution to find the number of intersection points of each system.

Exercise 14 - Find the parameter

For which values of k does the line $y = 2x + k$ meet the parabola $y = x^2$ in exactly one point, two points, and no points?

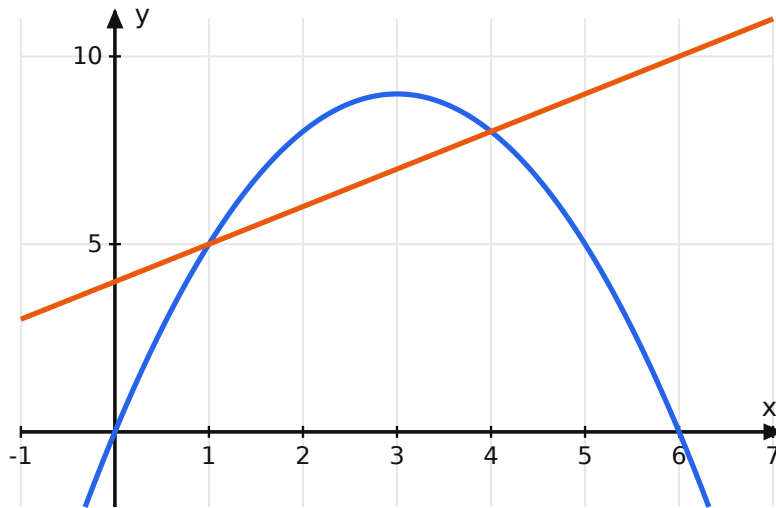
Exercise 15 - Perimeter and area

A rectangle has perimeter 30 meters and area 56 square meters. Find its length and width using the system $x + y = 15$ and $xy = 56$.

Exercise 16 - Two numbers

Two numbers have a sum of 12 and a product of 32. Find them.

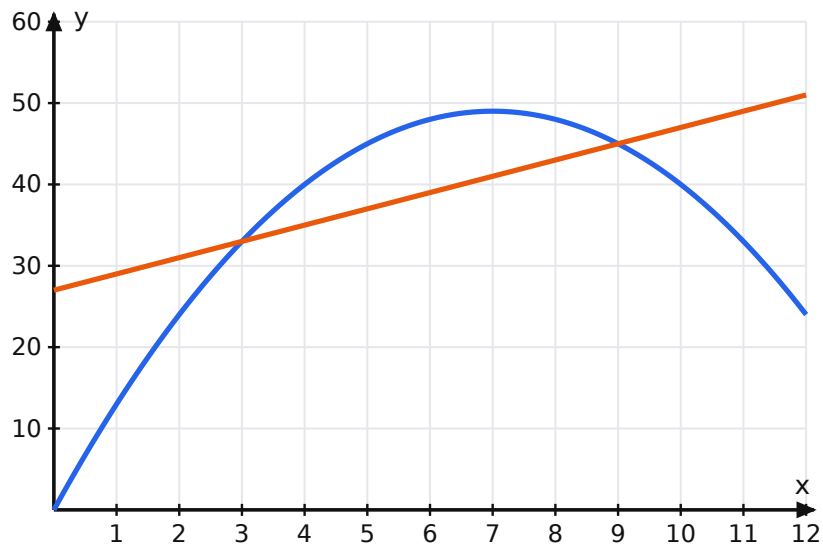
Exercise 17 - Ball and ramp



Path of a ball and a ramp (feet).

A ball's path is $y = -x^2 + 6x$ and a ramp is the line $y = x + 4$ (both in feet). Find where the ball meets the ramp.

Exercise 18 - Break-even



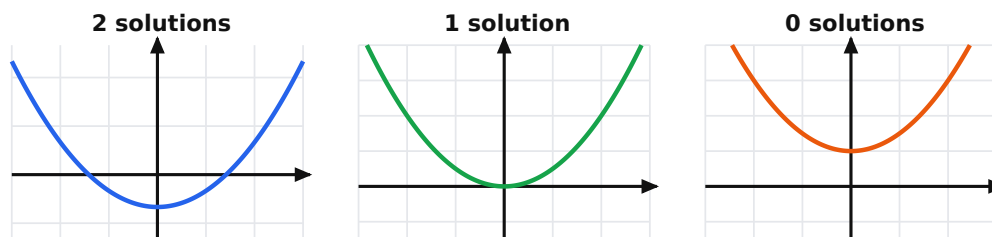
Revenue and cost (hundreds of dollars).

A school's revenue is $R = -x^2 + 14x$ and its cost is $C = 2x + 27$, both in hundreds of dollars for x hundred items. Find the break-even quantities.

Exercise 19 - Find the error

Noah solved $y = x^2$ and $y = x + 6$ and wrote the answer $x = 3, x = -2$. What is incomplete about his answer, and what is the complete solution?

Exercise 20 - Write a system



A line and a parabola can meet in 2, 1, or 0 points.

Show that the system $y = x^2 - 4x + 3$ and $y = x - 1$ has the solutions (1,0) and (4,3), and decide which panel above matches it.