

Solution Sets, Line-Parabola Systems and Exponentials

Grade 9 – Algebra 1 math · Test · Standards: A-REI.D.10, A-REI.C.7, F-IF.C.7e, A-SSE.B.3c

Name: _____ Date: _____ Class: _____

This test has 8 questions worth 20 points. Allow 45 minutes and work without notes. A calculator is allowed. Show every equation you solve, because partial credit is given for correct setups.

Standards: A-REI.D.10, A-REI.C.7, F-IF.C.7e, A-SSE.B.3c · **Level:** Grade 9 Algebra 1

Time: 45 minutes · 8 questions · Total: 20 points · Calculator: as allowed by your teacher

Question 1 Points on a Parabola (2 points)

Which of the points $(2, -3)$, $(-1, 2)$ and $(4, 5)$ lie on the graph of $y = x^2 - 2x - 3$? Show your work.

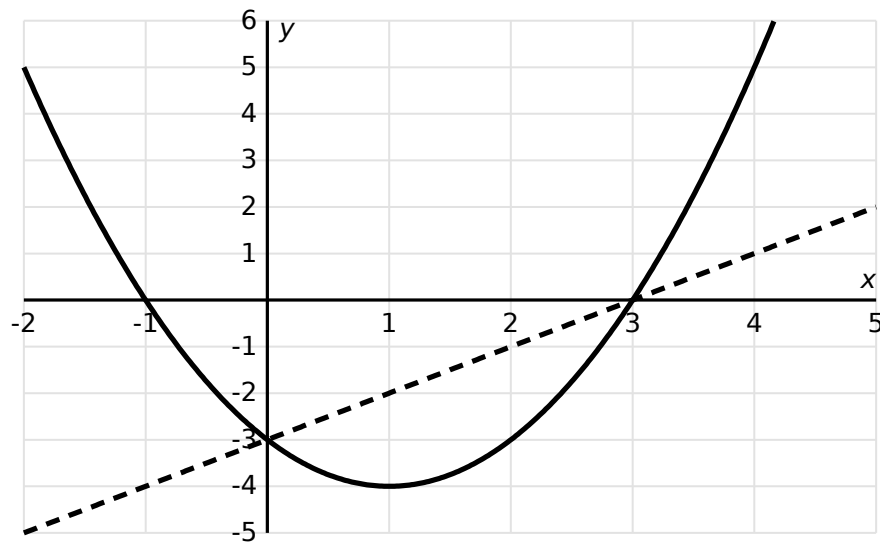
Question 2 Line and Parabola (3 points)

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

- Write the equation you get by setting the expressions equal. (1 point)
- Solve it for x . (1 point)
- Find the matching y -values. (1 point)

Question 3 Estimate Then Confirm (3 points)

The graph shows a parabola (solid) and a line (dashed).



A parabola (solid) and a line (dashed).

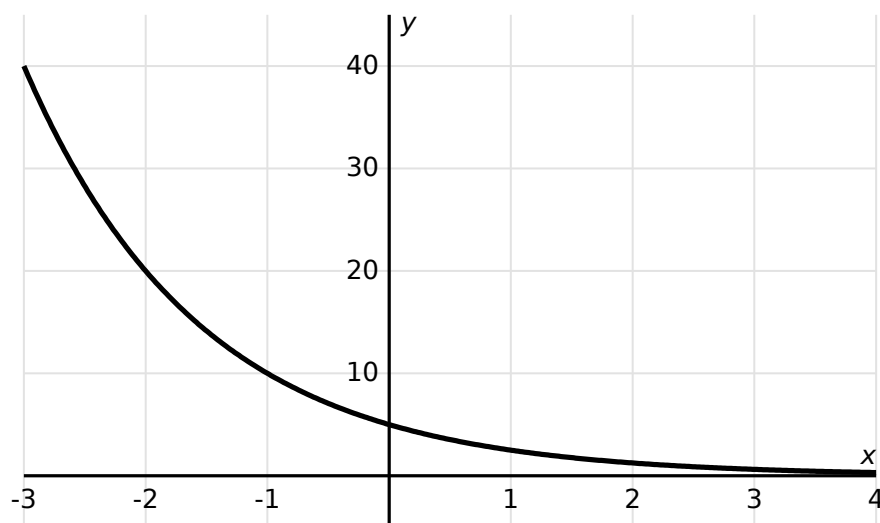
- Estimate the intersection points from the graph. (1 point)
- The curves are $y = x^2 - 2x - 3$ and $y = x - 3$. Confirm your estimate algebraically. (2 points)

Question 4 No Intersection (2 points)

Show that the line $y = 2x - 3$ and the parabola $y = x^2 + 1$ do not intersect.

Question 5 Exponential Graph (3 points)

The graph shows an exponential function.



An exponential function.

- Give the y-intercept and write the equation. (1 point)

- b. Describe the end behavior as $x \rightarrow \infty$ and $x \rightarrow -\infty$. (1 point)
- c. Find the value of the function at $x = -5$. (1 point)

Question 6 Monthly Growth Factor (3 points)

A balance is modeled by $A = 800(1.12)^t$, where t is in years.

- a. Rewrite A with an exponent equal to the number of months and give the monthly factor to four decimal places. (2 points)
- b. Find the balance after 6 months, to the nearest cent. (1 point)

Question 7 System Solution Check (2 points)

Show that $(3, 9)$ is a solution of the system $y = x^2$ and $y = 4x - 3$, then find the other solution.

Question 8 Rewrite an Exponent (2 points)

Rewrite 5^{x+2} in the form $a \cdot 5^x$, then evaluate it at $x = 1$.