

Key Features of Graphs and Rates of Change

Grade 9 – Algebra 1 math · Test · Standards: F-IF.B.4, F-IF.B.6, F-IF.C.9

Name: _____ Date: _____ Class: _____

This test has 8 questions worth 20 points in total. Show the formula or substitution you use, write intervals with inequalities and include units when a context is given. A calculator is allowed. Plan on about 45 minutes.

Standards: F-IF.B.4, F-IF.B.6, F-IF.C.9 · **Level:** Grade 9 Algebra 1

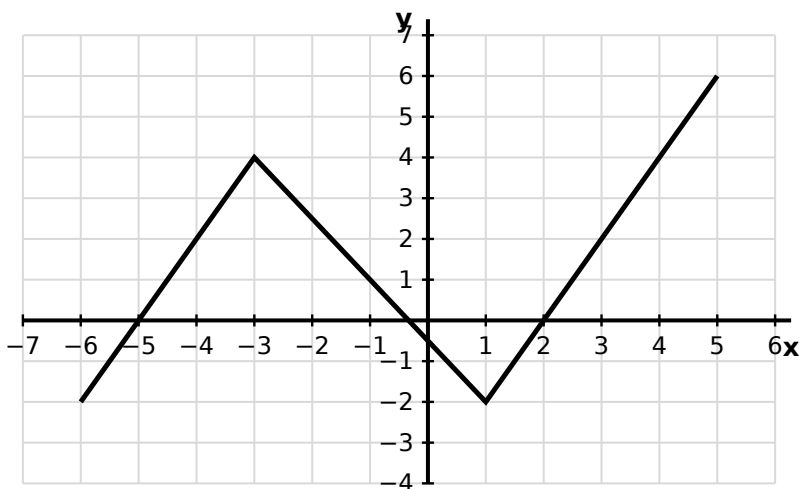
Time: 45 minutes · 8 questions · Total: 20 points · Calculator: as allowed by your teacher

Question 1 Intercepts from an equation (2 points)

Find the x- and y-intercepts of $3x - 5y = 30$.

Question 2 Features of a graph (3 points)

Study the graph of g .



The graph of g .

(a) State where g is increasing. (1 point) (b) State where g is decreasing. (1 point) (c) Name the relative maximum point and the relative minimum point. (1 point)

Question 3 Rate of change from a table (3 points)

A function has the table

x	0	3	6	9
$f(x)$	5	11	35	77

(a) Find the average rate of change from $x = 3$ to $x = 9$. (2 points) (b) Explain what your answer

means. (1 point)

Question 4 Zeros and end behavior (2 points)

For $f(x) = -x^2 + 9$: (a) find the zeros. (1 point) (b) describe the end behavior. (1 point)

Question 5 Drone flight (3 points)

A drone's height in feet is $h(t)$ with $h(0) = 20$, $h(4) = 100$ and $h(10) = 40$, where t is in seconds. (a) Find the average rate of change from 0 to 4 seconds. (1 point) (b) Find it from 4 to 10 seconds. (1 point) (c) Interpret the sign of part (b). (1 point)

Question 6 Axis of symmetry (2 points)

The graph of $f(x) = (x + 2)^2 - 5$ is symmetric about a vertical line. (a) Write the equation of the line. (1 point) (b) The point (1, 4) is on the graph. Name its mirror point. (1 point)

Question 7 Compare two functions (2 points)

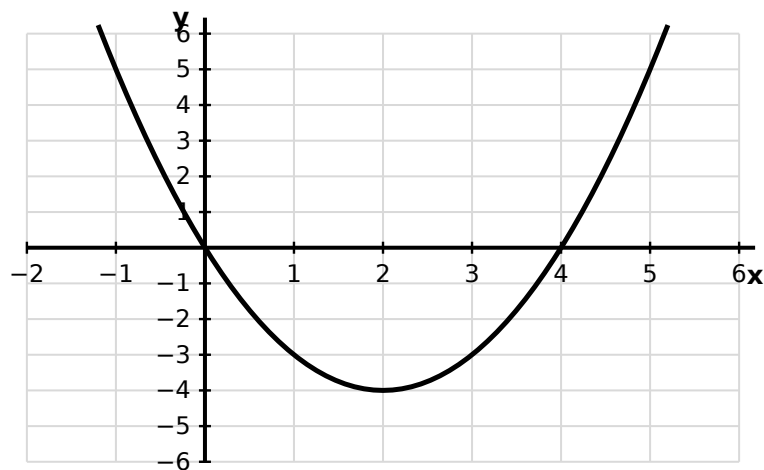
Let $f(x) = 6x - 4$. Function g has the table

x	0	1	2	3
$g(x)$	2	9	16	23

Which function rises faster, and which starts higher at $x = 0$?

Question 8 Parabola features (3 points)

Study the graph of h .



The graph of h .

(a) Name the vertex, and decide if it is the lowest or the highest point. (1 point) (b) Where does the graph cross the x -axis? (1 point) (c) State where h is negative. (1 point)