



BLUE VALLEY SCHOOL

Mathematics Department

Mr. Neeman

Midterm #2, 10A

Topic: functions, analytic geometry

2nd bimester, FS 2011

Total points possible: 35

Total points earned:

Estimated time: 80 minutes

Student Name: _____

Date: _____

Instructions: Answer all the questions, working carefully and showing your work neatly. Unless otherwise stated, assume a function's domain is its maximal domain and its codomain is \mathbb{R} . Make sure the final answer is easily identifiable and that all the working is shown.

#1. Consider the function $f(x) = 2\sqrt[3]{x}$.

(a) Find its inverse function, f^{-1} . (2 pts)

(b) Find $f^{-1}(4)$. (1 pt)

#2. Are the functions $f(x) = \frac{2}{x-3}$ and $g(x) = \frac{2}{x} + 3$ inverses of each other? (2 pts)

#3. (a) Suppose L_1 is the line which passes through the points $(2, 2)$ and $(5, -4)$. Find its equation. (2 pts)

(b) Find the equation of a line L_2 , which is parallel to L_1 and which passes through the point $(-2, 4)$. (2 pts)

(c) Find the equation of a line L_3 , which is perpendicular to L_1 and which passes through the point $(-2, -6)$. (2 pts)

(#3, continued)

(d) Find the point of intersection of L_2 and L_3 . (3 pts)

#4. Suppose L_1 is a line with gradient -3 and passing through the point $(-2, 3)$.

(a) Find L_1 's equation. (1 pt)

(b) Find L_1 's intersections with the axes. (2 pts)

(#4, continued)

(c) Suppose, further, that L_2 is the line with equation $x = -3$. Find the point of intersection of L_1 and L_2 . (2 pts)

(d) Draw a labelled diagram representing L_1 and L_2 . Make sure to label the intersection between the two lines and all their intersections with the axes. (2 pts)



(e) Find the area of the triangle formed by L_1 , L_2 , and the x axis. (2 pts)

(#4, continued)

(f) Find the length of the triangle's diagonal side. (1 pt)

(g) Find the midpoint of the triangle's diagonal side. (1 pt)

#5. Consider the function $f : [-4, -2] \rightarrow \mathbb{R}$, with $f(x) = -x - 1$.

(a) Find the function's range. (2 pts)

(b) Sketch the function's graph. (1 pt)

(c) Is the function injective? (1 pt)

#6. Consider the function $f : \{-3, -2, 0, 4\} \rightarrow \{1, 2, 4\}$, with $f(-3) = 2$, $f(-2) = 4$, $f(0) = 4$, and $f(4) = 1$.

(a) Find the image of 4. (1 pt)

(b) Find any preimages of 4. (1 pt)

(c) Find the function's range. (1 pt)

(d) Is the function injective? (1 pt)

(e) Is the function surjective? (1 pt)

(f) Is the function bijective? (1 pt)