

University of South Carolina
Math 111: College Algebra
Instructor: Austin Mohr
Section 8
Fall 2008

Test 1
(100 points total)

[10] 1. Describe the vertical line test. Why is it able to determine if a given graph represents a function?

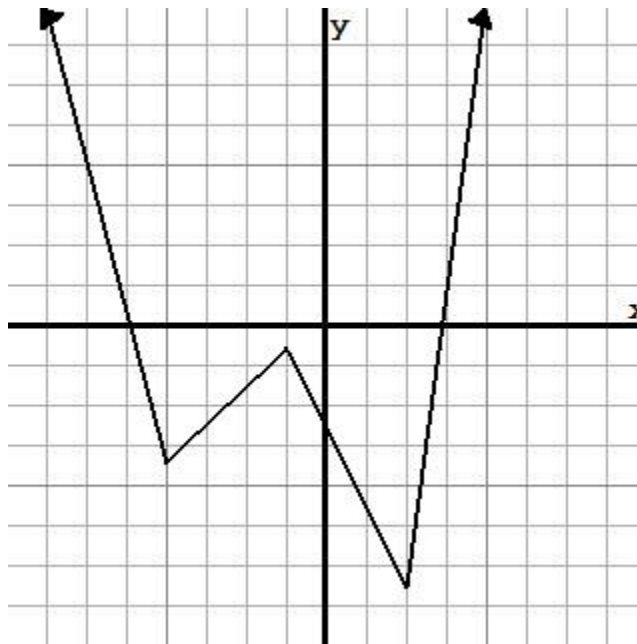
[12] 2. Find the domain of each of the following.

a. $f(x) = \frac{x+1}{x^2+4x+3}$

b. $f(x) = 4x^3 + 2x^2 + 3x$

c. $f(x) = \sqrt{3x+1}$

[12] 3. The graph below represents a function $f(x)$.



- On what interval(s) is $f(x)$ increasing?
- On what interval(s) is $f(x)$ decreasing?
- Does $f(x)$ have a global maximum? If so, where does it occur and what is its value?
- Does $f(x)$ have a global minimum? If so, where does it occur and what is its value?

[12] 4. Consider the following table.

| Year | Population (millions) | Rate of Change |
|-------------|----------------------------------|-----------------------|
| 1900 | 3 | — |
| 1910 | 6 | 0.3 |
| 1920 | 8 | |
| 1930 | 13 | 0.5 |
| 1940 | 19 | 0.6 |
| 1950 | 17 | -0.2 |
| 1960 | 24 | 0.7 |

Note: The Rate of Change column shows the average rate of change over the previous 10 years.

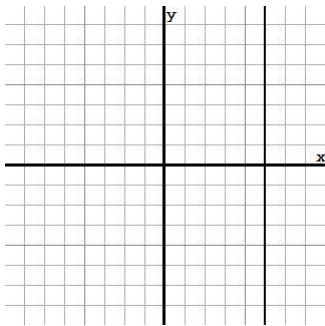
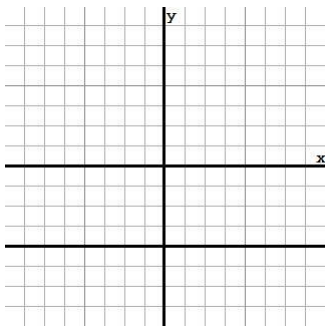
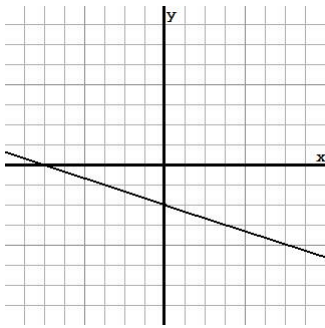
a. Compute the value for the Rate of Change column in 1920.

b. Estimate the population in 1932.

c. Without graphing, determine if this is a linear function. Explain your answer.

[9] 5. Find the equation of the line containing the points $(-1,3)$ and $(2,-4)$.

[12] 6. Determine the equation of the line in each graph below.



[14] 7. A particular junior college charges \$200 per credit hour in addition to \$450 in registration fees (regardless of the enrolled hours).

a. Write an equation $F(h)$ that determines the total fees for a student enrolled in h credit hours.

b. What is a reasonable domain for F ?

c. Use your formula to determine the cost for a student enrolled in 15 credit hours.

d. A student received a bill for \$4050. For how many hours is she enrolled?

[9] 8. Determine if the following lines are parallel, perpendicular, or neither.

a. $y = 2x + 1$, $y = -2x + 1$

b. $y = -\frac{1}{2}x + 4$, $y = -\frac{1}{2}x + 5$

c. $y = -4x + 1$, $y = \frac{1}{4}x + 9$

[10] 9. Graph the piecewise function

$$f(x) = \begin{cases} (x - 1)^2 + 2 & \text{if } x \leq 3 \\ x + 1 & \text{if } x > 3 \end{cases}$$

