

MATH 120R -Test 1 review

1. Let $g(x) = \frac{4 - x^2}{x^2 + x}$
 - (a) Find the domain of $g(x)$
 - (b) Solve the equation $g(x) = 0$
2. Find the equations of the lines passing through the point (a, b) that are parallel and perpendicular to the line $y = mx + c$ (assuming that $m \neq 0$)
3. Find the average rate of change of $f(x) = 3x^2 + 1$ between the points $(x, f(x))$ and $(x + h, f(x + h))$
4. The table gives the average weight, w in pounds of American men in their sixties for various heights, h in inches
 - (a) How do you know that the data in this table could represent a linear function?
 - (b) Find weight, w as a linear function of height h . What is the slope of the line? What are the units for the slope?
 - (c) Find height h as a linear function of weight, w . What is the slope of the line? What are the units for the slope?

h (inches)	68	69	70	71	72	73	76	75
w (pounds)	166	171	176	181	186	191	196	201

5. Find the domain for the function $f(x) = \frac{\sqrt{2x}}{\sqrt{3-x}}$
6. Find the domain for the function $g(t) = \sqrt{-x}$
7. Find the domain for the function $r(x) = \sqrt{4 - \sqrt{x-4}}$
8. Graph the function $f(x) = \begin{cases} |x| & x \leq 1 \\ -2x & x > 1 \end{cases}$
9. Find the equation of the line l if its slope is $m = 4$ (picture)
10. The line l is parallel to the line $y - 2x - 1 = 0$. Find the coordinates of the point p . (picture)
11. Explain why a graph that fails the vertical line test does not satisfy the definition of a function

12. a) Goeyness of pizza is a function of the amount of cheese (in ounces) on the pizza. Find the average rate of change of this function $g(t) = 2\pi t^2$ over the interval $[0, 3]$
- b) Sketch the graph of $g(t)$. Provide a graphical interpretation of your results from part A on your graph of $g(t)$.
- c) Explain in words the significance of your result for part a.

13. The populations of four different towns, P_A, P_B, P_C , and P_D , are given by the following formulas where t is the year:

$$P_A = 10,000 + 1800t, \quad P_B = 55,000 - 300t, \quad P_C = 850t + 35,000, \quad P_D = 20,000(1.09)^t$$

- a) which populations are represented by linear functions?
- b) Describe in words what each linear model tells you about the towns population. Which town starts out with the most people? Which is growing fastest?
- c) When do towns A and B have the same populations?
- d) Will towns A and C ever have the same populations? If so, when?
14. Tuition cost T (in dollars) for part-time students at the University of Cyprus is given by $T = 300 + 200C$, where C represents the number of credits taken.
- (a) Find the tuition cost for eight credits.
- (b) How many credits were taken if the tuition was \$1700?
- (c) What does the 300 represent in the formula for T ?
- (d) What does the 200 represent in the formula for T ?
15. The formula $V = f(r) = \frac{4}{3}\pi r^3$ gives the volume of a cone of radius r . Find a formula for the inverse function $f^{-1}(V)$, giving radius as a function of volume.

16. Let $g(x) = \frac{x^2 + 2x + 6}{x^3 + 5}$ Find $g(3a + 1)$ and $g(4) + 1$.

17. Give an example of the graph of a function that is decreasing at the interval $[-4, -1)$ and it is increasing at the interval $(-1, 3]$.

18. Could the function f in the table be concave up?

x	-2	0	2	4
f(x)	5	6	8	12

19. In 1996 the population of a city was 143,247 and in 2000 it was 167,933. Estimate the population in 1998. (Assume that the population is a linear function of the time)

20. Suppose that f is an one-to-one function and $f(-1) = 3$. Which of the following cannot be true?
- (a) $f^{-1}(-3) = 1$ (b) $f^{-1}(4) = -1$ (c) $f(3) = -1$ (d) $f^{-1}(-1) = 3$ (e) $f(5) = 1$