

Math 115 Carter Sample Test 1 Spring 2004

1. Solve the inequalities:

(a) $0 \leq 2 - x$

(b) $0 \leq 4 - x^2$

(c) $|3x - 4| < 8$

(d) $(x + 2)(x - 4) < 0$

2. Determine the domains of the following functions:

(a) $f(x) = \sqrt{2 - x}$

(b) $f(x) = \sqrt{x^2 - 4}$

(c) $f(x) = \frac{4x-7}{2x-10}$

(d) $f(x) = x^3 + 4x^2 - \sqrt{17}x + \pi$

3. Compute the difference quotient $\frac{f(x+h)-f(x)}{h}$ for the functions:

(a) $f(x) = 2x - 3$

(b) $f(x) = x^2$

(c) $f(x) = \frac{1}{x}$

(d) $f(x) = x^3$

4. Compute $f(g(x))$ and $g(f(x))$ for the functions $y = f(x)$ and $y = g(x)$ that are below.
BE SURE TO LET ME KNOW WHICH IS WHICH!

(a) $f(x) = x^2$; $g(x) = 3x + 2$

(b) $f(x) = |x|$; $g(x) = 2x - 3$

(c) $f(x) = \frac{1}{x}$; $g(x) = 3x - 4$

5. Sketch the graph of each of the following functions:

(a) $f(x) = 12x - 0.01$

(b) $f(x) = 25x^2 - 0.1x + 12$

(c) $f(x) = 3|x + 5| - 27$

(d) $f(x) = \frac{1}{x-6} + 4$

6. Determine the equations and sketch the graphs of the following lines:

(a) The line that passes through the point $(0, 7)$ and that has slope -3 .

(b) The line that passes through the points $(12, 4)$ and $(3, 1)$.

(c) The line whose x -intercept is $(-18, 0)$ and whose y -intercept is $(0, 12)$.

(d) The line that passes through the point $(7, 6)$ and that is parallel to the line $y = 5x - 4$.

7. Determine the maximum value for the product $A = xy$ when $3x + 4y = 5$.

8. An open box with square base is to be made from a square piece of paper that is 12 inches by 12 inches. For square corners are cut from the box and the rectangular sides are folded up. Determine the volume of the largest such box that can be made. (Hint: use your graphing calculator.)