

University of South Carolina
Math 115: Precalculus
Instructor: Austin Mohr
Section 006
Fall 2009

Test 1

Do not write on this page. Instead, use the blank paper provided to show all your work and answers. Keep this page when you are finished.

1. Give the domain of the following functions.

- a. $f(x) = \sqrt{2x - 3}$
- b. $f(x) = x^2 + 1$
- c. $f(x) = \frac{2x-1}{x^2+14x-15}$

2. Write in simplest terms. Your answer should not contain negative exponents or radicals.

- a. $\frac{3}{x-5} - \frac{2}{x+7}$
- b. $\sqrt{16xy^4} \div \sqrt[3]{\frac{8}{x^5y^2}}$
- c. $\frac{(x^{-3}y^2)^{-1}}{x^{-2}y^6}$

3. Solve for x .

- a. $|1 - 2x| \leq 5$
- b. $x = \frac{-2}{x+3}$
- c. $x^3 + 6x^2 + 11x + 6 = 0$ given that one of the factors is $(x + 2)$

4. In each part, give the equation of the function described.

- a. The line through the points $(-1, -2)$ and $(-5, 1)$
- b. The circle with center $(1, -3)$ through the point $(4, 2)$
- c. The polynomial with roots $x = -1$, $x = 1$, and $x = 2$ (Hint: Think about how this polynomial would look in factored form.)

5. After an evening of drunken soul-searching, your instructor realizes his true calling is to tend bars. He purchases a fire-damaged trailer in southern Georgia for \$40,000 and opens shop. He estimates he will spend \$2500 monthly on alcohol.

- a. Construct a function $f(t)$ that models the total cost to run the bar, where t is measured in months.
- b. How much money will have been spent over the course of the first year?
- c. Assume that, instead of serving customers, the owner drinks all the alcohol himself. How long can he continue to run the bar if he only has \$60,000?

Extra Credit: Expand $(2x - 3y)^4$ using Pascal's Triangle.