

**Calculus with Precalculus I (12011 Section 02)**  
**Home Work 5, due Friday, October 6.**  
**Instructor: Prof. Artem Zvavitch**

**Problem 1.** *Simplify*

$$25^{\frac{1}{2}} + 8^{-\frac{2}{3}} - \sqrt{(-3)^2}.$$

**Problem 2.** *Simplify*

$$\frac{a^2 b^{\frac{2}{3}}}{\sqrt{ab^{-\frac{1}{3}}}}$$

**Problem 3.** *Find the domain of function*

$$f(x) = \frac{1}{\sqrt{x^2 + 2x}} + \frac{1}{x + 1}.$$

**Problem 4.** *Find an equation of the line through points (1, 1) and (-2, 3).*

**Problem 5.** *Find an equation of the line through point (-1, 1) and perpendicular to the line  $y = \frac{1}{3}x - 3$ .*

**Problem 6.** *Sketch the graph of function*

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

**Problem 7.** *Find maximum or minimum of the following function*

$$f(x) = -x^2 - x + 2.$$

*Also find x-intercepts and y-intercepts and sketch the graph of this function.*

**Problem 8.** *Solve*

$$x^3 - 2x^2 - 4x = 0.$$

**Problem 9.** *Solve*

$$|x - 2| + 1 = x.$$

**Problem 10.** *Simplify*

$$\frac{x^2 - x - 2}{4 - x^2}.$$

**Problem 11.** *Simplify*

$$\frac{x}{x^2 - 9} + \frac{2x}{x^2 - 2x - 3} - \frac{3}{x + 1}.$$

**Problem 12.** *Find the average rate of change of function  $f(x) = \frac{1}{x^2}$  on the interval [1, 3].*

**Problem 13.** *Give the definition of increasing function. Show that  $f(x) = |x|$  is not increasing function on the interval [-1, 1].*