

# Math 1010 - Practice Final Exam

University of Utah

Fall 2009

**Name:** \_\_\_\_\_

- There are 20 problems, and each is worth five points. So, there are 100 points possible.
- You are not allowed to get help from your textbook, class notes, other students, or any other form of outside aid. You're only allowed to use scratch paper if you need it. If you have questions, please ask your instructor. You may not talk with other students during the exam.

*Problem Scores:*

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20

**Total Score:**

1 **When Math had Numbers.** - Simplify the fraction:

$$\frac{3}{4} - \frac{\frac{1}{10}}{\frac{1}{5}}.$$

**2 Absolutely Equal.** Find the solution(s) to the equation:

$$|x + 8| = |2x + 1|.$$

- 3 **Working Together is Fun.** A master gravedigger can dig Ophelia's grave in five hours. An apprentice gravedigger can dig her grave in 8 hours. How long does it take the two of them to dig the grave if they work together, assuming they don't talk.

**4 Going the Distance.** Find the distance between the points  $(1, 3)$  and  $(4, -2)$ .

- 5 **Find that Line.** Find an equation for the line with slope 2 and  $x$ -intercept 5. Note that it says  $x$ -intercept, not  $y$ -intercept.

6 **Master of Your Domain.** Find the domain of the function:

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

**7 Working the System.** Solve the following system of linear equations:

$$\begin{array}{rcl} x & - & 2y = -1 \\ x & - & 5y = 2 \end{array}$$



8 **Not the O'reilly Factor.** Factor the following polynomial:

$$15x^2 - 11x + 2$$

9 **Keep It Simple.** Simplify the following expression. Your answer must contain only positive exponents:

$$\frac{(2x^{-2}y^4)^3y}{(10x^3y)^2}.$$

10 **Add 'Em Up.** Perform the indicated operations and simplify:

$$\frac{x}{x^2 - 9} + \frac{3}{x^2 - 5x + 6}$$

- 11 **Grow, Grow, Grow!** A biologist starts a culture with 100 bacteria. The population  $P$  of the culture is approximated by the model below, where  $t$  is the time in hours. Find the time required for the population to increase to 800 bacteria.

$$P = \frac{500(1 + 3t)}{5 + t}.$$

12 **Thesis, Antithesis, Synthesis.** Find the quotient and remainder:

$$\frac{x^5 - 13x^4 - 120x + 80}{x + 3}$$

13 **Step One Is?**. Solve the rational equation:

$$\frac{15}{x} + \frac{9x - 7}{x + 2} = 9.$$

14 **Rules for Radicals** - Simplify the radical expression:

$$-\sqrt[4]{\frac{42y^7}{81x^4}}.$$

15 **Even More Radical** - Combine the radical expression, if possible:

$$3y\sqrt[4]{2x^5y^3} - x\sqrt[4]{162xy^7}.$$



- 16 **It's Easy If You Try** - Write the complex number in standard form:  
(Note : Standard form is  $a + bi$ ).

$$\sqrt{-25} - \sqrt{49}$$

17 **The One Equation You Must Know!** - Find the solution(s) to the quadratic equation:

$$3x^2 + 7x = 2.$$

- 18 **Real Graphs Have Curves** - Write the equation of the parabola with vertex  $(-2, 2)$  and  $y$ -intercept  $(0, -2)$ . Graph the parabola. (*Hint:*  $x = -b/(2a)$ ).

19 **It's Logarithm, Logarithm, It's Big It's Heavy It's A Function**<sup>1</sup> -  
Compute the following logarithms:

- $\log_4(256)$

- $\log_2(0.25)$

- $\log_{16}(8)$  (*Hint: Use the change of base formula.*)

Narf! Zoit! Egad!

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<sup>1</sup>This is a very obscure and butchered reference to Ren and Stimpy.

- 20 **Ben Franklin Would Be Proud** - You invest money at an annual interest rate of 7 percent. How long (in years) will it take for your investment to triple (increase to three times its original amount)? Give your answer as a logarithmic expression, don't worry about a decimal value.