

Math101, Sections 2 and 3, Spring 2008
Review Sheet for Exam #1: 02-12-08

Sections 1.1 and 1.2 cover basic operations on real numbers. You need to be able to add, subtract, multiply and divide numbers. Some of the trickier problems you may see on the exam might look like any of the following.

1.

a) Simplify $|-1| + |-2| - |5|$.

b) If possible, divide $\frac{\frac{12}{13}}{\frac{5}{0}}$.

c) If possible, divide $-\frac{22}{23} \div (-\frac{33}{4})$.

Section 1.3 is about Exponents, Roots, and Order of Operations. One thing to always remember is $(-1)^{\text{odd}} = -1$ and $(-1)^{\text{even}} = 1$. For example, $(-1)^{2007} = -1$ and $(-1)^{2008} = 1$. This can be useful and often necessary to simplify some expressions.

Know the difference between $-a^n$ and $(-a)^n$. As an example,

2.

a) Evaluate -2^4 .

b) Evaluate $(-2)^4$.

c) Evaluate $(-3)^3$.

d) Evaluate -3^3 .

You also need to know the order of operations. The mnemonic device PEMDAS ‘Please Excuse My Dear Aunt Sally’ may be helpful. The only misleading thing about this is that Multiplication doesn’t always come before Division. You need to do these from left to right. The following example should illustrate this concept

3. Simplify the expression

$$\frac{-14\left(-\frac{2}{7}\right) \div (2 \cdot 6 - 10)}{2^3 - (-2)^3 - 2 - 6}$$

Recall that \sqrt{b} is whatever positive number when multiplied by itself twice gives you b . Even though $(-6)(-6) = 36$, we would like to restrict square roots to the positive number. Hence $\sqrt{36} = 6$.

4. True or False. $\sqrt{x^2} = x$. If it's false, fix it.

You should be able to solve any linear equation in one variable problem. As an example, look at the problems 9 – 30, 35 – 41 or some of the problems with decimals: 45 – 50 from section 2.1. There will very likely be a problem that combines multiple methods from each of these sections. As an example, you might want to try

5 Solve the following equation for y :

$$\frac{2y - 1}{3} + \frac{y - 6}{2} = .01(y + 1).$$

Section 2.2 discusses basic formulas. You should know very basic formulas like how to find the perimeter/area of a rectangle, or what the distance formula is. You don't need to know wacky formulas like how to find the surface area of a dodecahedron. One skill that you should know from this section is how to solve a given equation for any one variable. As an example of a hard problem, try

6. Solve the following equation for r :

$$2x + y = \frac{3r + 1}{sr} + \frac{2x + 1}{s}$$

7. If the circumference of a circle is 480π inches, what is its radius? What is its diameter?

From section 2.3, any of the problems 9 – 14 look like good problems to ask. The other important idea that came up in this section was the idea of a percent. Your two examples that were in the homework involved acid mixing problems and simple interest rate problems. As an example, you might want to look at problem 43 and 49.

Section 2.4 discussed more word problem applications. The two important ideas were problems that involved coins, or problems that involved distance. As an example, try the following problems

8. Suppose I have 22 coins in my pocket. I know that I only have nickels, quarters and dimes, and that I have twice as many nickels as quarters, and 2 more dimes than nickels. When I hand my coins to a cashier, after getting chewed out for paying with change, she tells me I gave her 2.40. How many dimes did I give her?

9. Rupert and Fenton are caravanning to go see a Packers game. Fenton leaves Madison at 9:00am and drives at an average speed of 60mph on the freeway. Rupert leaves Madison at 9:20am and drives

at an average speed of 75mph. What time does Rupert catch up to Fenton?

Section 2.5 Discusses Linear Inequalities in One Variable. You can basically solve these the same way you would linear **equations** with a few things to consider. Whenever you multiply or divide by a negative number you need to change the order of the inequality. One other thing to keep in mind is expressions like $x \leq 5$ are **exactly** the same as $5 \geq x$.

Now, if you can understand how to take intersection and union of sets of numbers, these problems will be very easy. Please do the homework from section 2.6. Even though I'm not collecting this homework set, it's **extremely** important you know how to do problems from this section. If you can understand this section, the problems in section 2.7 will be very easy to do.

I may prepare a separate review for problems from sections 2.6 and 2.7 if everyone is interested.