MATH 100 **April 8, 2008**

Test 2 - Solutions

1. A test in an Algebra class is worth 50 points. Ten students took the test and got scores 20, 25, 30, 35, 35, 40, 45, 45, 45, 50. Find the mean, median, and mode of these scores.

   The mean (average) is the sum of all the scores divided by the number of scores, i.e. $\dfrac{20+25+30+35+35+40+45+45+45+50}{10} = \dfrac{370}{10} = 37.$

   The median is the average of the two middle scores, i.e. $\dfrac{35+40}{2} = \dfrac{75}{2} = 37.5.$

   The mode is the score that occurs most often, i.e. 45.

2. Answer "true" or "false". (Note: you are not required to provide explanations, but you may receive partial credit if your explanations are on a right track even if they contain mistakes and your answer is wrong.)

   (a) The difference of two irrational numbers is always irrational.

   False. For example, π *is an irrational number, but the difference* $\pi - \pi = 0$ *is not irrational.*

   (b) If a is a factor of b, then $\dfrac{a}{b}$ is an integer.

   False. For example, 2 *is a factor of* 6*, but* $\frac{2}{6}$ *is not an integer.*

   (c) -1 is a rational number.

   True. -1 *can be written as a quotient of integers:* $\frac{-1}{1}$.

3. (a) Answer "true" or "false". Explain using the definition.

   i. 60 divides 30

   False: 30 *is not* 60 *times an integer.*

   ii. 60 is divisible by 30

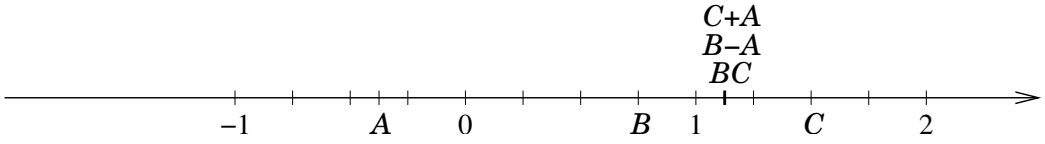
   True: $60 = 30 \cdot 2$.

   (b) Find the greatest common factor and the least common multiple of 60 and 30.

   Since 30 *is the largest factor of itself and is a factor of* 60*,* $GCF(60, 30) = 30$.

   Since 60 *is the smallest multiple of itself and is a multiple of* 30*,* $LCM(60, 30) = 60$.

4. Numbers A, B, and C are shown on the real number line below.



   Determine and show on the same picture approximate locations of the following numbers:

   (a) $C + A \approx 1\frac{1}{2} + (-\frac{3}{8}) = 1\frac{1}{2} - \frac{3}{8} = 1\frac{1}{8}$

   (b) $B - A \approx \frac{3}{4} - (-\frac{3}{8}) = \frac{3}{4} + \frac{3}{8} = \frac{9}{8} = 1\frac{1}{8}$

   (c) $BC \approx \frac{3}{4} \cdot \frac{3}{2} = \frac{9}{8} = 1\frac{1}{8}$

5. Solve the following equation over the set of real numbers:

$$\frac{x-3}{4} = \frac{x+2}{3}$$

Multiply both sides by 12*:* $3(x-3) = 4(x+2)$
simplify: $3x - 9 = 4x + 8$
$x = -17$

6. **For extra credit:** Find an irrational number between -0.02 and -0.01.

   $-0.01 - \frac{\pi}{10^3} = -0.01 - \frac{3.14\ldots}{10^3} = -0.01 - 0.00314\ldots = -0.01314\ldots$ *is irrational since it is a non-repeating decimal and is between the given numbers.*