Math 1120 **Decimals Worksheet** **Spring 2011**

1. Write each of the following in words.

   (a) 0.45

   Solution: Forty-five hundredths.

   (b) 20.063

   Solution: Twenty and sixty-three thousandths.

   (c) −2.0002

   Solution: Negative two and two ten thousandths.

   (d) 0.000052

   Solution: Fifty-two millionths.

2. A baseball player's batting average was reported as "three-twenty-two." A batting average is essentially determined when you divide the number of times that the player hits the ball by the number of times at bat. Explain why the reported batting average is not mathematically correct.

   Solution: The batting average should really be listed as "0.322," meaning that the baseball player will hit the ball 322 times out of every 1000 times at bat. Notice that this is the same as saying that the player will hit the ball 32.2% of the time.

3. Explain whether 1 day can be expressed as a terminating decimal part of a 365-day year.

   Solution: One day will be a fraction equal to

   $$\frac{1}{365} = \frac{1}{5 \cdot 73}.$$

   Since the denominator has a 73 in it (which is not a 2 or 5), we know that the decimal version of this fraction is not terminating.

4. In many non-English speaking countries, a comma is used instead of a period to denote a decimal mark. (E.g., instead of 90.23 we could write 90,23.) Why would using a comma for a decimal mark be a bad idea if you are used to the American/English number writing system?

   Solution: We use commas as the following example shows:

   $$302,201,203,100.$$

   Thus, if we were to use a comma for the decimal point, things could get confusing.

5. Write the results of each of the following in scientific notation.

   (a) $(8 \times 10^{12})(6 \times 10^{15})$

   Solution:

   $$\begin{aligned}
   (8 \times 10^{12})(6 \times 10^{15}) &= 8 \times 6 \times 10^{12} \times 10^{15} \\
   &= 48 \times 10^{27} \\
   &= 4.8 \times 10 \times 10^{27} \\
   &= 4.8 \times 10^{28}
   \end{aligned}$$

   (b) $(16 \times 10^{12}) \div (4 \times 10^5)$

   Solution: There are several ways to simplify this.

   $$\begin{aligned}
   (16 \times 10^{12}) \div (4 \times 10^5) &= \frac{16 \times 10^{12}}{1} \times \frac{1}{4 \times 10^5} \\
   &= \frac{16}{1} \times \frac{10^{12}}{1} \times \frac{1}{4} \times \frac{1}{10^5} \\
   &= \frac{16}{4} \times \frac{10^{12}}{10^5} \\
   &= \frac{4}{1} \times \frac{10^7}{1} \\
   &= 4 \times 10^7
   \end{aligned}$$

(c) $(5 \times 10^8)(6 \times 10^9) \div (15 \times 10^{15})$

Solution:

$$(5 \times 10^8)(6 \times 10^9) \div (15 \times 10^{15}) = \left(5 \times 10^8 \times 6 \times 10^9\right) \div (15 \times 10^{15})$$

$$= (30 \times 10^{17}) \div (15 \times 10^{15})$$

$$= \frac{30 \times 10^{17}}{1} \times \frac{1}{15 \times 10^{15}}$$

$$= \frac{30}{1} \times \frac{10^{17}}{1} \times \frac{1}{15} \times \frac{1}{10^{15}}$$

$$= \frac{30}{15} \times \frac{10^{17}}{10^{15}}$$

$$= 2 \times 10^2$$