MATH 123 **Order of Operations**

Determine the value of the given expression, reducing all fractions completely. Carefully consider the operations that you perform in evaluating the expression. Remember that obtaining a "correct answer" is more than getting the correct numerical value for the expression. A correct answer includes the notation, the structure, and the formatting that you use as you work the problem to its numerical value. You should work these problems *without* using a calculator.

1. $\frac{5}{12}\left(-\frac{8}{15}\right)\left(-\frac{1}{3}\right)$ **2.** $\left(-\frac{33}{8}\right)\left(-\frac{28}{210}\right)$ **3.** $\left(\frac{5}{12}-\frac{9}{16}\right)\frac{3}{7}$ **4.** $\left(\frac{7}{15}-\frac{11}{20}\right)\frac{3}{7}$

5. In working problems similar to Problems 1 – 4 above, what should one consider when evaluating expressions containing fractions? What observations can you make while working Problems 1 and 2? What observations did you make while working Problems 3 and 4 above?

6. $24 \div \frac{3^2}{8-5} - (-5)$

7. $16 - 4 \cdot \frac{3^3 - 7}{2^3 + 2} - (-2)^2$

8. Given the expression $5 - 8 \cdot \frac{4+6^2}{4^2-6} \div (-4)^2 + 20$,

(a) can we reduce the 4 and the 6 that we see in the fraction? Explain.

(b) Evaluate the expression.

9. Is the expression $5 - 8 \cdot \frac{4+6^2}{4^2-6} \div \left((-4)^2 + 20\right)$ the same as the expression given in Problem 8 above? Explain your answer. Evaluate the given expression.

10. $25 - 8 \div \frac{6^2+4}{4^2-6} - (-4)^2$

11. Is the expression $25 - 8 \div \frac{6^2+4}{4^2-6} - -4^2$ the same as the expression given in Problem 10 above? Explain your answer. Evaluate the given expression.

12. $25 - 8 \div \frac{-6^2-4}{4^2-6} - (-4)^2$

13. Is the expression $25 - 8 \div \frac{-6^2-4}{-4^2+6} - -4^2$ the same as the expression given in Problem 12 above? Explain your answer. Evaluate the given expression.

14. Given the expression $25 - 8 \div \frac{(-6)^2-(-4)}{(-4)^2+(-6)} - -4^2$,

(a) can we reduce the –4 and the –6 in the fraction? Explain.

(b) Evaluate the expression.

15. Is the expression $25 - 8 \div \frac{(-6)^2-(-4)}{(-4)^2+(-6)} - (-4)^2$ the same as the expression given in Problem 14 above? Explain your answer. Evaluate the given expression

16. In evaluating any expression, what do you use to determine how to evaluate and to simplify the expression?