The first midterm will be held on **Friday, October 21** from 11:00–11:50am for Section A and 3:00–3:50pm for Section B in our regular classroom **WLH 2204**. The exam will cover materials from the beginning to end of the lecture on Wednesday 10/19. They are corresponding to the first four homework assignments. Below are a few highlighted topics.

- Basic operations on integers, fractions, and exponents. Order of operation.
- Solving a linear equation and checking whether a given value is a solution to an equation.
- Solving word problems that involve linear equation.
- Absolute value. Solving linear equation involving absolute values.
- Finding $x$- and $y$-intercepts of a line given its equation.
- Equation of a line in both standard and slope-intercept form. Know how to convert the line equation between these two forms.
- Writing the equation of a line in the slope-intercept form given
  - The slope and one point on the line,
  - Two points on the line,
  - One point on the line and the fact that the required line is parallel/perpendicular to another line.
- Identifying the number of solutions in a given system of linear equations. Finding the intersection between two lines.
- Solving systems of linear equations using substitution and addition/elimination methods.
- Basic rules for exponents. Simplifying an expression that involves exponents.
- Identifying polynomial and finding degree and leading coefficient.
- Basic operations on polynomials.
- Lastly, review all the exercises from the first four homework assignments. The next page has some extra sample exercises for you to practice.
1. Solve the following equations for $x$ and remember to check your answer:

   $\begin{align*}
   (a.) \quad \frac{7}{4}x + \frac{1}{4} + x &= 8 - 2x, \\
   (b.) \quad \frac{x + 4}{3} &= \frac{6 - x}{7} + 2, \\
   (c.) \quad -5|x + 7| + 73 &= 13, \\
   (d.) \quad 0.3x^2 + 0.12x + 0.8 &= -0.14 + 0.3x^2, \\
   (e.) \quad -3|1 - 4x| &= -|x + 1|.
   \end{align*}$

2. Find the equation in slope-intercept form ($y = mx + b$) of the line that contains the point $(2, 3)$ and one of the following:
   a. has a slope of 3.
   b. contains another point $(4, 8)$.
   c. is parallel to the line $4x - 10y = -6$.
   d. is perpendicular to the line going through $(0, 4)$ and $(6, 7)$.
   e. has an $x$-intercept of 5.

3. Without solving the systems, determine the number of solution in each of the following:

   $\begin{align*}
   (a.) \quad \begin{cases} 2y = 5x + 3 \\ y = \frac{5}{2}x + 7 \end{cases}, \\
   (b.) \quad \begin{cases} 5x + 8y = -14 \\ 2x - y = 6 \end{cases}, \\
   (c.) \quad \begin{cases} \frac{3}{7}x - \frac{7}{3}y = 21 \\ \frac{1}{7}x - \frac{1}{3}y = 2 \end{cases}.
   \end{align*}$

   Now use both methods (substitution and addition) to solve each of the above system to confirm your answer. If the system has a unique solution, find it. If the system has infinitely many solution, find the equation of a line to which the solutions are restricted.

4. Simplify the following expressions, using only positive exponent in your final answer.

   $\begin{align*}
   (a.) \quad \frac{(2x^2 - 3)^3}{(3x^3 - 5)}, \\
   (b.) \quad \left(\frac{3xy^2 - 3}{y - 1}\right)(y^{-2}z^4), \\
   (c.) \quad \frac{6xy^2 + 3y}{3yz}, \\
   (d.) \quad \left(2x + \frac{1}{2}x\right)^2
   \end{align*}$

5. Write $2^{10} \times 4^3 \times 16^5$ as a power of 4.

6. Expand

   $\begin{align*}
   (a.) \quad (2x + 3)(3x + 4), \\
   (b.) \quad (x - 2y)(x - 2y), \\
   (c.) \quad (x^2 + 2x + 1)(2 - x).
   \end{align*}$

7. Find the intersection between the two lines $y = 2x + 1$ and $y = \frac{3}{2}x + 7$.

8. The sum of two numbers is 48. One number is 16 more than 3 times the other number. What are the two numbers?

9. The sum of four consecutive integers is 50. Find these numbers.

10. Divide

    $\begin{align*}
    (a.) \quad \frac{y^2 - 5y - 6}{y^2 - 1}, \\
    (b.) \quad \frac{3x^2 - 8x + 4}{x - 2}.
    \end{align*}$