Math 1075: Midterm Exam 1

Instructions:

- Show ALL work to receive full credit. Answers with insufficient supporting work will receive little or no credit.

- Please CIRCLE your answers

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<td>Maximum Points</td>
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1. Solve the following inequalities \textit{algebraically}. \textit{Express your answer in interval notation.} (6 points each)

\begin{enumerate}
  \item \[ |9y + 2| \geq 20 \]
  \item \[ \left| \frac{4x - 13}{7} \right| < 9 \]
\end{enumerate}
2. Graph the solution set of \[ \begin{cases} 3x + 2y \leq 14 \\ -3x + 4y > -12 \end{cases} \] on the grid below. (5 points)

3. Solve for \(x\) algebraically. (5 points)
\[ |6x - 7| = |5x + 2| \]
4. Algebraically solve each of the following. *Express your answer in interval notation.*  
(5 points each)

a) \(18n + 56 > 23n - 14\)

b) \(\frac{11w - 20}{3} \leq -2(5 - w)\)

5. a) Write the sentence as a mathematical inequality.  
(6 points)

*The product of \(y\) and six exceeds three times the sum of \(y\) and four.*

b) Algebraically solve your answer to part a).  
(4 points)

*Express your answer in interval notation.*
6. Completely factor each of the following binomials. (5 points each)

   a) \( x^4 + x^2 \)
   b) \( 36u^2 - 121v^2 \)
   c) \( 27a^3 + 125 \)
   d) \( m^4 - 81 \)
7. Solve the following equations. (6 points each)

a) \((5n - 2)(n + 6) = 0\)

b) \(c^2 = 2c + 63\)

c) \((3x + 2)^2 = 16\)
8. Completely factor each of the following polynomials.  (5 points each)

a) \(4R^2 - 40R - 96\)  
b) \(14kz^2 - 21kz - 10hz + 15h\)

c) \(-p^2 + 12p - 32\)  
d) \((x - 2y)a^2 - (x - 2y)a - 20(x - 2y)\)