MATH 1075 Midterm Exam 1

Instructions:

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

• Write clearly and legibly. Illegible answers and ambiguous markings will not receive credit.

• Completely simplify all answers.

• Please CIRCLE your answers.

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1. (16 points) Algebraically solve the following. Express your answers in interval notation. If there is no solution, write $\emptyset$. (8 points each)

(a) $48 > 6(5 - 11p)$

(b) $13u + 4 \geq -6$ and $14u - 7 < 35$
2. (5 points) Graph the solution to the following system of inequalities.

\[-x < y - 8\]
\[x \geq 4y - 12\]

3. (6 points) Solve for \(p\) algebraically.

\[|8p + 4| - 20 = -3\]
4. (16 points) Solve each absolute value inequality algebraically. Express your answers in interval notation.

(a) \(40 \geq |5w - 5|\)

(b) \(8|t + 2| + 9 > -31\)
5. (18 points) Completely factor each of the following expressions. (6 points each)

(a) \(28k^9m^5 - 26p^8k^4m^7\)

(b) \(5g^3 - 80g\)

(c) Recall: the difference of cubes formula is \(A^3 - B^3 = (A - B)(A^2 + AB + B^2)\).
Use this formula to completely factor the binomial:
\[
8a^6 - \frac{27}{64}
\]
6. (18 points) Completely factor each of the following polynomials. (6 points each)

(a) $7b^4 - 7b^3 - 35b + 35$

(b) $5x^2 - 45x - 110$

(c) $10V^2 - 11V - 6$
7. (21 points) Use the Zero Product Rule to solve the following equations. (7 points each)

(a) $12w^2 = 10w$

(b) $2x^2 + 8x + 1 = (x + 3)^2$

(c) $4n^2 - 20n = -25$