TMAT/AMAT 118 　　　　　　　　Diagnostic Quiz 1 (not for credit)

Name: _____

1. Evaluate each expression:
   - (a) $-4^3$
   - (b) $4^{-3}$
   - (c) $8^{-4/3}$

2. Simplify the expression $\left(\frac{x^{3/2}y^3}{x^{-1/2}y^{-1}}\right)^{-2}$.

3. Factor the polynomial $x^4 - 5x^3 + 6x^2$.

4. Simplify the expression $\frac{\frac{x}{y} - \frac{y}{x}}{\frac{1}{y} - \frac{1}{x}}$.

5. Solve the following equations:
   - (a) $3|x - 4| = -9$,
   - (b) $-2x(4 - x)^{-1/2} + 3\sqrt{4 - x} = 0$.

6. Solve the inequality $\frac{2x-3}{x+1} \leq 1$. Write your answer using interval notation.

7. State whether each equation is true for all possible vales of x and y. (Write true or false).
   - (a) $(x + y)^2 = x^2 + y^2$
   - (b) $(xy)^{1/3} = x^{1/3}y^{1/3}$
   - (c) $\sqrt{x^2 + y^2} = |x| + |y|$
   - (d) $\frac{1+xy}{y} = \frac{1}{y} + x$. (Assume $y \neq 0$.)
   - (e) $\frac{1}{x-y} = \frac{1}{x} - \frac{1}{y}$. (Assume $x \neq 0$, $y \neq 0$, and $x - y \neq 0$.)

8. Find the equation for the line that:
   - (a) passes through the points $(1, 2)$ and $(0, 1)$,
   - (b) passes through (1,2) and is vertical,
   - (c) passes through (1,2) and is parallel to the line $y = x$.

9. Find the equation for the circle which has the line segment from $(1, 1)$ to $(-1, -1)$ as a diameter.

10. Sketch the region in the xy-plane defined by the inequalities $x^2 \leq y \leq 1$.