MATH 111 NOV. 8, 2019 EXAM 3 NAME:_____

Prob.	1	2	3	4	5	6	7	Total
Value	9	18	10	10	17	18	18	100
Points								

"I'm a great believer in luck, and I find the harder I work, the more I have of it." — Thomas Jefferson

Recall, it is your job to demonstrate the extent to which you understand each problem, this means *write mathematics*. A good write-up includes: connecting your work, proper notation, and an explanation of steps as you see necessary.

1. Completely simplify each expression:

   (a) $\dfrac{5x^3}{(-5x^2)^2}$

   (b) $\left(-2x^{-1}\right)^2\left(\dfrac{x^7}{x^{-3}}\right) - 3^2$

2. Factor completely.

(a) $5x^3 - 25x^2 - 20x + 100$

(b) $9x^3 + 6x^2 + x$

(c) $x^{2n} - 25$

3. Perform the indicated operation, and simplify completely.

$$\frac{x+7}{3x+6} - \frac{x}{x^2-4}$$

4. Divide, using long division. Be sure to ANSWER THE QUESTION ASKED. In other words, clearly write your answer to the question on the line below. Show all work to arrive at your answer below that line.

$$\frac{9x^3-3x^2-3x+4}{3x+2} \quad =$$

5. Perform the indicated operations, and simplify completely.

(a) $\dfrac{\dfrac{1}{x-1}+1}{\dfrac{1}{x+1}-1}$

(b) $\dfrac{\dfrac{2x}{x^2-25}+\dfrac{1}{3x-15}}{\dfrac{5}{x-5}-\dfrac{5}{4x-20}}$

6. Solve each equation.

(a) $(x-3)(x+8) = -30$

(b) $\dfrac{x^2}{18} + \dfrac{x}{2} = -1$

7. Solve each equation, clearly indicate your solution(s).

(a) $x + \frac{7}{x} = -8$

(b) $\frac{x+6}{3x-12} = \frac{5}{x-4} + \frac{2}{3}$