SLCC **Math 1090 EXAM 1 FORM A**

Name:_____ Instructor:_____

Date: _____

**Instructions:**

You have 1 hour to complete the exam. You may use any calculator, however cell phones or other devices that connect to the internet are not permitted. Notes or books are NOT allowed.

Work 10 of the 12 problems on this exam. Cross-out the 2 problems that you do not want graded. The first 10 problems not crossed-out will be scored.

Show all necessary work for each of the 10 problems you choose. If you turn in work on another paper, clearly number each problem.

1. Simplify the expression.

$$\frac{\frac{1}{x}+\frac{1}{y}}{\frac{1}{xy}}$$

2. Write the expression in simplest radical form.

$$\sqrt{40x^3y^4}$$

3. The annual sales (in billions of dollars) of global positioning system (GPS) equipment from 2000 through 2006 are shown in the following table where x = 0 corresponds to the year 2000:

| **Annual Sales, y** | **6.9** | **8.6** | **10.5** | **12.3** | **14.2** | **16** | **17.8** |
|---|---|---|---|---|---|---|---|
| **Year, x** | 0 | 1 | 2 | 3 | 4 | 5 | 6 |

a) Find the linear function y(x) that predicts the annual sales for a given year. Round your answer to the nearest hundredth.

b) Using the equation found in part (a), estimate the annual sales of GPS equipment in 2007.

4. Sketch the graph of the function with the given rule. Find the domain and range of the function.

$$f(x) = \begin{cases} x, & if\ x < 0 \\ 2x + 1, & if\ x \geq 0 \end{cases}$$

5. Factor the polynomial.

$$12x^2y - 2xy - 24y$$

6. Simplify the expression, writing your answer using positive exponents only.

$$\left(\frac{3^2x^{-2}y^2}{2^2x^2y^{-2}}\right)^{-2}\left(\frac{3^2y^5}{2^4y}\right)^2$$

7. If the line passing through the points (y, 1) and (5, 8) is parallel to the line passing through the points (4, 9) and (y+2, 1), what is the value of y?

8. Find $f\ o\ g$ and $g\ o\ f$ given $f(x) = 2\sqrt{x} + 3$ and $g(x) = x^2 + 1$

9. AutoTime, a manufacturer of 24-hr variable timers, has a monthly fixed cost of $50,000 and a production cost of $9 for each timer manufactured. The unit sells for $16 each. Find the break-even point for the manufacturer.

10. Solve the equation:

$$x^4 - 13x^2 + 36 = 0$$

11. Find the values of x that satisfy the inequality:

$$0 \leq x + 1 \leq 4$$

12. A manufacturer has a monthly fixed cost of $100,000 and a production cost of $14 for each unit produced. The product sells for $20/unit.
    a) What is the cost function?

    b) What is the revenue function?

    c) What is the profit function?

    d) Compute the profit (loss) corresponding to production levels of 20,000 units.