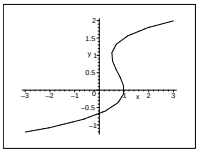
**Math 111 Mathematical Methods** **11 April 2005**
**Exam 2** **Crawford**
**Name:** _____

Books and notes are not allowed. No calculators on Part A. You may use a calculator on Part B. You must completely finish Part A and turn it in before you work on Part B. Clearly indicate your answers. *Show all your work* – partial credit may be given for written work. Good Luck!

| | Score |
|---|---|
| 1 | /2 |
| 2 | /8 |
| 3 | /5 |
| 4 | /1 |
| 5 | /6 |
| 6 | /6 |
| 7 | /5 |
| 8 | /10 |
| 9 | /10 |
| 10 | /10 |
| 11 | /12 |
| 12 | /10 |
| 13 | /10 |
| 14 | /10 |
| Total | /100 |

**Part A** No calculators on Part A. You must completely finish Part A and turn it in before you work on Part B.

**1.** (2 pts). Does the following graph represent $y$ as a function of $x$?



**2.** (8 pts). Given $f(x) = x^2 - \frac{1}{x}$, find the following.

**(a).** $f(-1)$ [Expand and Simplify]

**(b).** $f\left(\frac{3}{5}\right)$ [Expand and Simplify]

**(c).** $f(1-2x)$ [Do Not Simplify]

**3.** (5 pts). Given $-2x + y = -10$,

**(a).** Find the $x$- and $y$- intercepts.

**(b).** Graph the line and clearly label the intercepts.

**4.** (1 pts). Sketch a line going through the point $(4, -2)$ that has undefined slope.

**Part B** You must completely finish Part A and turn it in before you may use a calculator on Part B. Show all your work in a clear and organized fashion. Clearly indicate your answers.

**5.** (6 pts). Given $f(x) = 3x - 5$ and $g(x) = x^2 - 4$, find

**(a).** $(f/g)(x)$

**(b).** $(g \circ f)(x)$

**6.** (6 pts). Find the domain and range of $f(x) = x^2 + 2x + 1$

**7.** (5 pts). Simplify the complex fraction $\dfrac{2 - \dfrac{3}{a}}{\dfrac{1}{a} + \dfrac{1}{b}}$

**8.** (10 pts). Solve the following equations for $x$.

**(a).** $-4(1 + x) = 5x - 4$

**(b).** $\dfrac{2}{x - 3} = \dfrac{1}{x + 3}$

**9.** (10 pts).

**(a)**. If the cost of an item is \$4.75, and the markup is 120% of the cost, what is the selling price?

**(b)**. If the cost of an item is \$90, and the markup is 60% of the selling price, what is the selling price?

**10.** (10 pts). A tile store owner buys a new diesel truck for \$43,000 and it costs 0.26 per mile to operate.

**(a)**. Write a linear equation for the cost of owning the truck as a function of the number of miles driven.

**(b)**. If he has spent a total of \$60,000 on the truck, how many miles has it been driven?

**11.** (12 pts). Find the equation of each of the lines for the following information.
Write your answers in the form $y = mx + b$.

**(a)**. Line through the points $(-2, 2)$ and $(5, 2)$

**(b).** Line through the point $(4, -3)$ and with slope 0.

**(c)**. The line with intercept -2 and perpendicular to the line $y = -\frac{1}{7}x + 5$

**12.** (10 pts). Solve the following linear equations algebraically. Show all of your work. If the system is dependent or inconsistent, clearly state so.

$$\begin{cases} 2x + 3y = 8 \\ 3x + 4y = 10 \end{cases}$$

**13.** (10 pts). A dance event charges \$20 for tickets bought online before the event. They charge \$30 for tickets at the door. They have a total of 500 tickets. How many of each type of ticket do they need to sell in order to make \$11800? Clearly indicate what $x$ and $y$ represent.

**14.** (10 pts). Given the following supply and demand curves,

$$\begin{aligned} \textit{supply}: \quad p &= 8.2q + 4 \\ \textit{demand}: \quad p &= -2.6q + 316 \end{aligned}$$

**(a)**. Find the market equilibrium point.

**(b)**. Will the be a market surplus or shortage if the price is \$200? Justify your answer.