

Math1090 Final Exam
Spring, 2007

Name _____

Instructions:

- 賞 Show all work as partial credit will be given where appropriate.
- 賞 If no work is shown, there may be no credit given.
- 賞 All final answers should be written in the space provided and in simplified form.

DO NOT WRITE IN THIS TABLE!!!
(It is for grading purposes.)

Grade:	1	
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Total

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1) Find all solutions to the following equation and inequality.

(a) $|3x+8|<2$

Answer 1a: _____

(b) $|2-3x|=-2$

Answer 1b: _____

- 2) The monthly revenue of a company is given by $R(p) = 900p - 8p^2$ where p is the price in dollars of the product manufactured. At what price will the revenue be \$20,000 if the price must be greater than \$50?

Answer 2: _____

- 3) Let $f(x) = \sqrt{x}$.

(a) Let $g(x) = \sqrt{x-3} + 2$. Then, $g(x)$ has the same shape as $f(x)$, but it's translated (aka shifted). Answer the following questions regarding $g(x)$ (compared to $f(x)$).

$g(x)$ is shifted _____ units to the left or right (circle one)
and it's shifted _____ units up or down (circle one).

(b) Now, let $h(x) = \sqrt{-x}$. Then, $h(x)$ is a reflection of $f(x)$ about the

x-axis or y-axis or neither axis (circle one).

4) For the following functions, answer the specified questions.

$$f(x) = x^3 + x \quad \text{and} \quad g(x) = \sqrt{x-1}$$

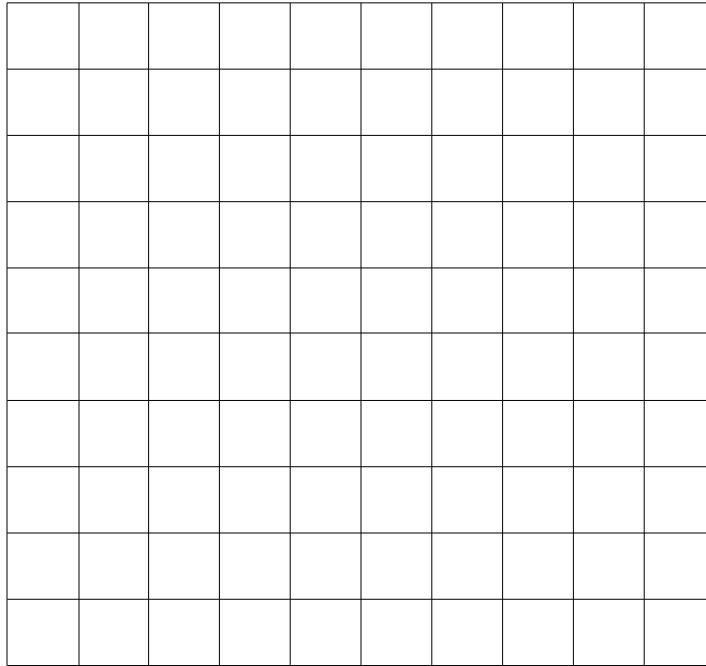
(a) What is the domain of $g(x)$? _____

(b) $(f \circ g)(17) =$ _____

(c) $g^{-1}(x) =$ _____

(d) $(f - g)(2) =$ _____

- 5) Find the x- and y-intercepts and the vertex of $f(x)=x^2+4x-5$ algebraically.
Use this information to sketch a graph of $f(x)$.



x-intercept(s): _____

y-intercept: _____

vertex: _____

- 6) Suppose that for a product A, the demand equation is $p = \frac{-1}{90}q + 10$ and the supply equation is $150p - q = 300$ where q is the number of units sold per week and p is the price per unit. Solve the system of equations to find the point of equilibrium.

Point of equilibrium _____

7) Solve for x.

(a) $\log_4(x-2)=-2$

x = _____

(b) $7^{2x+4}-3=11$

x = _____

(c) $\log_3 x + \log_3(3x)=3$

x = _____

8) Write each expression in terms of $\ln x$, $\ln y$, $\ln z$, and $\ln w$.

(a) $\ln\left(\frac{x^3 y^2 z^4}{w^5}\right) =$ _____

(b) $\ln\left(\left(\frac{1}{w^2}\right)^{-3} \sqrt{\frac{yz}{z^3}}\right) =$ _____

- 9) A trust fund is set up for a girl when she is born. How much must the single payment be if the trust fund is to be worth \$30,000 in 18 years? Assume the interest rate is 6% compounded monthly.

Single Payment = \$ _____

- 10) Suppose you take out an auto loan for \$8,500 at 6% interest compounded monthly for five years.
- (a) What is the monthly payment?
 - (b) How much is the finance charge?

(a) Payment = \$ _____

(b) Finance charge = \$ _____

11) Given the matrices A and B, perform the indicated operations or state that it's not possible. If it's not possible, explain why.

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}, \quad B = \begin{bmatrix} -4 \\ 7 \end{bmatrix} \quad \text{and} \quad C = \begin{bmatrix} -2 & 7 \\ 0 & 1 \end{bmatrix}$$

(a) $A + 2C$

(b) AB

$$A + 2C = \underline{\hspace{2cm}}$$

(c) BC

$$AB = \underline{\hspace{2cm}}$$

$$BC = \underline{\hspace{2cm}}$$

12) Solve the following system of equations using either Gauss-Jordan elimination, matrix reduction or an inverse matrix.

$$x + 3z = -2$$

$$2x + y - z = 3$$

$$-3y + 8z = 5$$

Solution: _____

13) Maximize the objective function $P = x + 2y$ subject to the constraints:

$$x \geq 0$$

$$y \geq 0$$

$$x + y \leq 8$$

$$x + 4y \leq 20$$



Maximum value of $P =$ _____

at the point _____