NAME: _____   ID: _____

Mathematics 1050 Fall 2009
Final Exam

Instructions: Complete the problems on the exam, showing all the steps you used to arrive at the answers, so that partial credit may be assigned for correct approaches leading to incorrect answers. **All final answers must be recorded in the spaces provided!** Only a correct final answer recorded in the space provided will receive full credit. Each problem is worth 5 points.

DO NOT WRITE IN THE TABLE BELOW!

Problem #	Points	Problem #	Points
1		11	
2		12	
3		13	
4		14	
5		15	
6		16	
7		17	
8		18	
9		19	
10		20	
Subtotal:		**Subtotal:**	
		Total:	

The formula for the amount of money in a bank account after t years of $r\%$ interest compounded n times per year, with initial balance P is: $P(1+(r/n))^{nt}$

The sum of an arithmetic series is: $(n/2)(a_1+a_n)$

The sum of a geometric series is: $a_1\dfrac{r^n-1}{r-1}$.

1. Set $f(x)=x^3-5x^2-14x$.
   a. Evaluate $f(-2)$.

   $f(-2)=$ _____

   b. Find the roots of f

   roots: _____

2. Solve for x, giving exact values, not approximations.
   a. $\log_2 x = -3$.

   $x=$ _____

   b. $\ln(x-1)+\ln(x-2)=\ln 6$.

   $x=$ _____

3. Plot $y=x^2+2x+3$, labelling at least one point on your graph.

4. Expand: $(x-3y)^4$ with terms ordered from greatest to least powers of x.

$(x-3y)^4 =$ _____

5. If $a_3=12$ and $a_5=48$, and a_n is a geometric sequence,
   a. Find a_1 and a_6.

$a_1 =$ _____

$a_6 =$ _____

b. Find the sum of the first 8 terms.

sum $=$ _____

6. Find the inverse of $f(x) = \dfrac{2x-3}{3x+4}$.
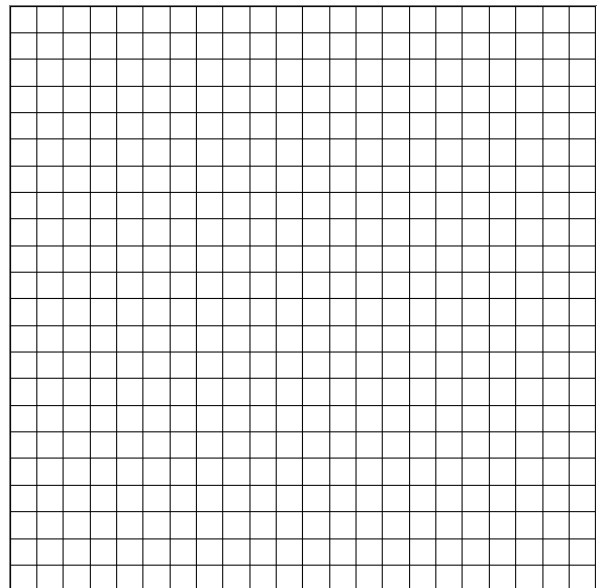
$f^{-1}(x) =$ _____

7. If a firm's profit function is $P(x)=400x-3600-4x^2$, where x is number of units sold, how many units need to be sold for the firm to break even?

number of units = _____

8. $f(x)= \sqrt{x+2}-1$.
    a. What is the domain of $f(x)$?

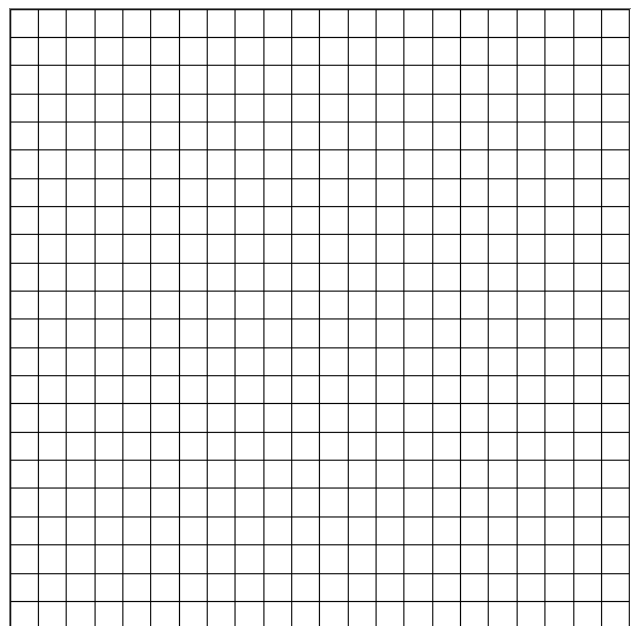domain: _____

b. Draw a graph of $y=f(x)$.

9. Find the equation of a line (in slope-intercept form) that is perpendicular to the line 2x-3y=6 and has the same *y*-intercept.

equation of line: _____

10. Find the equation of a parabola with roots -2 and 3 and with *y*-intercept (0,24).

equation of parabola: _____

11. Graph $y=\dfrac{2x-6}{x+2}$, labelling any asymptotes.

12. If you deposit $1000 into an account earning 4% interest compounded quarterly, how many years does it take your money to grow to $3000? Write an exact expression for your answer.

number of years: _____

13. Find the determinant of the matrix

$$\begin{bmatrix} 0 & 2 & -1 \\ 2 & 3 & 0 \\ 1 & -2 & 1 \end{bmatrix}$$

determinant: _____

14. Solve the system of equations:
$$x - y + z = 7$$
$$2x - 3y \quad = 5$$
$$4y + 2z = 2$$

$x =$ _____

$y =$ _____

$z =$ _____

15. Food X has 20 grams of carbohydrates and 5 grams of protein per serving. Food Y has 30 grams of carbohydrates and 2 grams of protein per serving. In order to consume exactly 290 grams of carbohydrates, and 45 grams of protein, how many servings of each food should be consumed?

servings of Food X: _____

servings of Food Y: _____

16. Let $f(x) = 2x + x^2$ and $g(x) = x + 1$. Find $(f \circ g)(x)$.

$(f \circ g)(x) =$ _____

17. Factor x^3+2x^2-5x-6 completely, using the fact that 2 is a zero.

$$x^3+2x^2-5x-6 = \underline{\hspace{8cm}}$$

18. Find the equation of a circle with (3,4) and (-3,-4) as endpoints of a diameter.

equation: $\underline{\hspace{8cm}}$

19. If ln$x$=3, ln y=-2, and ln z=4, evaluate

$$\ln\left(\frac{x^2}{z\sqrt{y}}\right).$$

value: $\underline{\hspace{3cm}}$

20. Multiply

$$\begin{bmatrix} 2 & 0 & -1 \\ 4 & -2 & 0 \end{bmatrix}\begin{bmatrix} 3 \\ 2 \\ -1 \end{bmatrix}.$$

product: $\underline{\hspace{5cm}}$