FINAL EXAM

Mathematics 1320/1420, Fall 2012

Group A

Name:

Follow the instructions given to you by your instructor. The test consists of 20 multiple choice problems and 4 problems to be worked out completely.

(1) Find the answers for the following division in the standard form

$$\frac{5+4i}{4-i}$$

(a) $\frac{16}{17}+\frac{21}{17}i$
(b) $\frac{6}{17}+\frac{24}{17}i$
(c) $\frac{3}{8}-\frac{3}{16}i$
(d) $\frac{3}{4}-\frac{3}{16}i$

(2) Find an equation for $f^{-1}(x)$, the inverse function, of

$$f(x)=\frac{2}{3x-1}$$

(a) $f^{-1}(x)=\frac{2}{3y}+\frac{1}{3}$
(b) $f^{-1}(x)=\frac{3x-1}{2}$
(c) $f^{-1}(x)=-\frac{1}{3}-\frac{2}{3x}$
(d) $f^{-1}(x)=\frac{2}{3x}+\frac{1}{3}$

(3) Find all the roots of $f(x)=2x^3-3x^2-11x+6$ given that (-2) is a root of $f(x)$

(a) $-\frac{1}{2},-2,6$
(b) $-2,\frac{1}{2},3$
(c) $-2,-3,\frac{1}{2}$
(d) $2,\frac{1}{2},-3$

(4) Find the solution set of the equation

$$\ln(x-4)+\ln(x+1)=\ln(x-8)$$

(a) {2,-2}
(b) {-2}
(c) {2}
(d) {∅}

(5) Find out all the solutions of the exponential equation

$$4^x = 2^{x^2-3}$$

(a) (-3,1)
(b) (-3,-1)
(c) (3,1)
(d) (3,-1)

(6) Solve the inequality of $2|-3x+1|-3 \leq 9$

(a) $\frac{4}{3} \geq x \geq -\frac{7}{3}$
(b) $\frac{7}{3} \geq x \geq -\frac{5}{3}$
(c) $\frac{6}{5} \geq x \leq \frac{2}{3}$
(d) $\frac{5}{3} \geq x \leq \frac{9}{5}$

(7) The equation of a line that passes through the point (1,2) is perpendicular to the line $2y+3x=1$ is

(a) $3y-2x=4$
(b) $3y-2x=-4$
(c) $2y-3x=4$
(d) $3y+2x=4$

(8) Find the solution of the system of linear equations in two variable

$$\begin{cases} 5x-4y=9 \\ x-2y=-3 \end{cases}$$

(a) (1,-1)
(b) (-1,1)
(c) (5,4)
(d) (3,3)

(9) Find coordinates of the vertex of $f(x)=-3(x-2)^2+12$

(a) (2,12)
(b) (2,-12)
(c) (2,-12)
(d) (-2,-12)

(10) Use the Rational Zero Theorem to list all possible rational zeros for the function

$$f(x)=6x^4+2x^3-4x^2+2$$

(a) $\pm\frac{1}{6},\pm\frac{1}{3},\pm\frac{1}{2},\pm\frac{2}{3},\pm1,\pm2,\pm3$
(b) $\pm\frac{1}{6},\pm\frac{1}{3},\pm\frac{1}{2},\pm1,\pm2$
(c) $\pm\frac{1}{2},\pm\frac{3}{2},\pm1,\pm2,\pm3,\pm6$
(d) $\pm\frac{1}{6},\pm\frac{1}{3},\pm\frac{1}{2},\pm\frac{2}{3},\pm1,\pm2$

(11) Evaluate the sum $\sum_{i=1}^{3}(2^i - 1)$

(a) 12
(b) 14
(c) 11
(d) 10

(12) Solve the equation $S = \frac{1}{2}ah + b$ for h

(a) $h = \frac{2(S+b)}{a}$

(b) $h = \frac{2(S-b)}{a}$

(c) $h = \frac{(S-b)}{2a}$

(d) $h = \frac{(S+b)}{2a}$

(13) The function $P(x) = 0.89x - 57$ models the relationship between the number of pretzels x that a certain vendor sells and the profit the vendor makes. Find $P(500)$, the profit the vendor makes from selling 500 pretzels.

(a) $388
(b) $408
(c) $433
(d) $475

(14) If $f(x) = 5 - x^2$ and $g(x) = x^2 + 4x - 12$, what is the domain for $\frac{f}{g}$?

(a) All numbers greater than zero
(b) All numbers except -3 and 4
(c) All numbers except 3 and -4
(d) All numbers except -6 and 2

(15) Solve the equation $\frac{2}{(x+1)} + \frac{3}{(x-3)} = \frac{6}{(x+1)(x-3)}$

(a) {1}
(b) {5/9}
(c) {9/5}
(d) {Ø}

(16) In an arithmetic progression the first tem, $a_1 = 2$, and common difference, $d = -2$. Find the 7^{th} term, a_7 using progression formula $a_n = a_1 + (n-1)d$.

(a) -10
(b) -9
(c) 12
(d) 14

(17) Find horizontal asymptote of the function $f(x) = \frac{4x^2}{2x^2+5}$

(a) $Y = 0$
(b) $Y = 4$
(c) $Y = 2$
(d) $Y = -2$

(18) Describe how to shift the graph of $f(x) = x^2$ to get the graph of $g(x) = (x-3)^2 + 2$

(a) Shift *f(x)* 3 units left and 2 units up to get *g(x)*
(b) Shift *f(x)* 3 units right and 2 units up to get *g(x)*
(c) Shift *f(x)* 3 units left and 2 units down to get *g(x)*
(d) Shift *f(x)* 3 units right and 2 units down to get *g(x)*

(19) A die is rolled. What is the probability of getting a number greater than 4?

(a) $\frac{1}{2}$
(b) $\frac{1}{3}$
(c) $\frac{2}{3}$
(d) $\frac{1}{6}$

(20) If $f(x) = 4 - x$ and $g(x) = 2x^2 + x + 5$, what is $f \circ g(x)$?

(a) $9 + 2x^2 + x$
(b) $-1 - 2x^2 - x$
(c) $-1 - 2x^2 + x$
(d) $2x^2 - 17x + 41$

(21) An automobile repair shop charged a customer \$512, listing \$187 for parts and the remainder for labor. If the cost of labor is \$25 per hour, how many hours of labor did it take to repair the car?

(22) How long will it take \$500 to grow to \$3500 at 7.5% annual interest compounded monthly?

(23) The exponential decay model for Strontium_90 is given by

$$A = A_0 e^{-.0248t}$$

Approximate the number of years needed to decay down Strontium_90 to half of initial size.

(24) You have 420 feet of fencing to enclose a rectangular plot that borders on a river. If you do not fence the side along the river. What is the largest area that can be enclosed?