# Math 100 – College Algebra Exam II

Monday July 3, 2006

Name: Instructor:

SHOW ALL NECESSARY WORK AND SIMPLIFY ALL ANSWERS COMPLETELY!

**1.** (5 pts) Solve: $4(x+3)=42-7(2x+6)$

**2.** (5 pts) Find the zero: $f(x)=3x-27$

**3.** (10 pts) Find all solutions:

(a) $x^2+4=0$

(b) $x^4-5x^2+4=0$

**4.** (5 pts) Simplify and write answer in the form $a+bi$: $\dfrac{3+2i}{1-i}+\dfrac{7-5i}{1-i}$

**5.** (5 pts) Simplify: $i^{84}$

**6.** (10 pts) For $f(x)=x^2-2x+2$,

(a) find the vertex:

(b) find the range:

**7.** (10 pts) Solve the following inequalities:

(a) $-5 \le 3 - 2x < 5$

(b) $|x - 21| > 21$

**8.** (10 pts) If possible, use the intermediate value theorem to determine if the following functions have real zeros between $a$ and $b$ where $a = -2$ and $b = -1$:

(a) $f(x) = x^2 + 1$

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

**9.** (5 pts) Use synthetic division to determine whether the numbers $5$ and $2$ are zeros of the polynomial $f(x) = x^3 - x^2 - x - 2$.

**10.** (5 pts) Find the quotient $Q(x)$ and the remainder $R$ for $(x^3 - 9x^2 + 23x - 15) \div (x + 2)$:

**11.** (10 pts) For $f(x) = x^3 - 27$,

(a) find the rational zeros, and then find the other zeros:

(b) factor into linear factors:

**12.** (5 pts) Find a polynomial of lowest degree with rational coefficients that has the zeros $\sqrt{7}$ and $2i$:

**13.** (15 pts) Solve:

(a) $\dfrac{3}{m+1}+\dfrac{2}{m-1}=\dfrac{5}{m^2-1}$

(b) $\sqrt[3]{5x-7}=2$

(c) $|x-7|+3=10$