Math 202, Class test, March 2, 2014

1. **(4 points)** Use the remainder theorem and synthetic division to show that $\frac{1}{5}$ and $-\frac{1}{7}$ are solutions of the equation

$$35x^4 + 33x^3 - 73x^2 + 3x + 2 = 0$$

2. **(3 points)** Factor the polynomial

$$35x^4 + 33x^3 - 73x^2 + 3x + 2$$

from the previous problem completely.

3. **(3 points)** Discuss and draw the graph of

$$f(x) = (x^2 - 4)(x - 1)(x + 3)$$

4. **(3 points)** Discuss and draw the graph of

$$f(x) = \frac{2 - x}{x - 4}$$

5. **(3 points)** Rewrite in the trigonometric form $z = |z|(\cos\phi + i\sin\phi)$ the complex number

$$z = \left(\frac{\sqrt{2} + i\sqrt{2}}{-\sqrt{3} + i}\right)^2$$

6. **(4 points)** Use de Moivre's theorem to write

$$\left(-\frac{\sqrt{3}}{2} + \frac{i}{2}\right)^{11}$$

in the form $a + bi$.