Handout 9 Note: Hour exam on May 17 will cover Assignments 4-6.

Remember that given a function f on an interval I, we use the "supremum norm notation"

$$\|f\|_\infty = \sup\{|f(x)| : x \in I\}$$

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Assignment 6 (due Monday May 13).

1. In each of the following determine $\|f\|_\infty$:

a) $f(x) = x^2 - x^3$ $(0 \le x \le 1)$.

b) $f(x) = x^2 - x^3$ $(-1 \le x \le 2)$.

c) $f(x) = \sin x$ $(-\infty < x < \infty)$.

2. In determining the answer to each of the following problems compute or estimate $\|f_n - f\|_\infty$:

page 163:1, 3, 13, 16, 19.

3. page 167: 1, 3, 7, 15.

Assignment 7 (due Wednesday May 22)

1. Compute:

a) $\dfrac{(1+i)(3-2i)}{8+i}$

b) Put the following in polar co-ordinate form (i.e., determine $r = |z| = \sqrt{x^2+y^2}$ and θ for which $z = r(\cos\theta + i\sin\theta)$)

i) $z = 1+i$, (ii) $z = 7+2i$, iii) $z = \frac{1}{2} - \frac{2}{3}i$.

c) Use the polar form to solve $z^2 = (1+i)$.

d) Prove that for any complex numbers $z = x+iy$ and $w = u+iv$, $\overline{zw} = \bar{z}\,\bar{w}$, and use this to prove that $|zw| = |z||w|$.

2. p. 195: 1, 2, 13a) b), 15.

3. Use the complex expressions for $\sin\theta$ and $\cos\theta$ to determine

$$\int_{-\pi}^{\pi} \cos mx \sin nx\, dx$$

$$\int_{-\pi}^{\pi} \sin mx \sin nx\, dx$$

$$\int_{-\pi}^{\pi} \cos mx \cos nx\, dx$$

for integers m, n.