Section 3.4
Solutions and Hints

by Brent M. Dingle

for the book:

<u>Precalculus, Mathematics for Calculus 4th Edition</u>
by James Stewart, Lothar Redlin and Saleem Watson.

34. Evaluate $(2 - 3i)^{-1}$ and write the result in the form $a + bi$.

$(2-3i)^{-1} = \frac{1}{2-3i} = \frac{1}{2-3i} * \frac{2+3i}{2+3i}$ Multiply by "one"

$= \frac{2+3i}{4+6i-6i-9i^2}$ Now simplify

$= \frac{2+3i}{4-9*(-1)}$

$= \frac{2+3i}{13}$ = **(2/13) + (3/13)*i*.**

42. Evaluate i^{1002} and write the result in the form $a + bi$.

This can be done several ways the easiest is to see that 1002 / 4 = 250 remainder 2.

So $i^{1002} = (i^4)^{250} * i^2 = 1^{250} * i^2 = i^2 =$ **-1**

44. Evaluate (-9/4)$^{1/2}$ and write the result in the form *a* + *bi*.

$\sqrt{\frac{-9}{4}} = \frac{\sqrt{-9}}{\sqrt{4}} = \frac{\sqrt{9*(-1)}}{2} = \left(\frac{1}{2}\right)*\left(\sqrt{9}\right)*\left(\sqrt{-1}\right)$ = (½)*3*i = **0 + (3/2)*i***.

52. Evaluate the below and write the result in the form *a* + *bi*.

IMPORTANT: $\frac{\left(\sqrt{-7}\right)*\left(\sqrt{-49}\right)}{\sqrt{28}} \neq \frac{\sqrt{-7*-49}}{\sqrt{28}}$,

this is a bizarre rule concerning two negative roots. Instead you MUST do the following:

$$\frac{\left(\sqrt{-7}\right)*\left(\sqrt{-49}\right)}{\sqrt{28}} = \frac{i*\sqrt{7}*i*\sqrt{49}}{\sqrt{28}} = \frac{i^2\sqrt{7*49}}{\sqrt{28}}$$

$$= \frac{-\sqrt{7*7*7}}{\sqrt{7*4}} = -\sqrt{\frac{7*7^2}{7*2^2}} = -\sqrt{\frac{7^2}{2^2}} = \frac{-\sqrt{7^2}}{\sqrt{2^2}} = \frac{-7}{2}$$ = **-7/2 + 0*i***.

64. Find all solutions to the below and express them in the form *a* + *bi*.

$4x^2 - 16x + 19 = 0$

Simply apply the quadratic formula, a = 4, b = -16, c = 19

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{16 \pm \sqrt{256 - 4*4*19}}{2*4} = \frac{16 \pm \sqrt{-48}}{8} = 2 \pm \frac{i\sqrt{4^2*3}}{8} = 2 \pm \frac{i\sqrt{3}}{2}$$