Trig 9.5

Alg 2
Ch. 5

Add, subtract, multiply, divide complex numbers in rectangular form

X Write equations with complex roots

real number

imaginary number

complex number

i

terms

like terms

FOIL (boo) EWE :)

iteration

conjugate pairs

$$\frac{-5+9i}{1-i} \cdot \frac{1+i}{1+i} = \frac{-14+4i}{1-i^2} = \frac{-14}{2} + \frac{4i}{2}$$

$$-7+2i$$

$$\begin{array}{r} -5+9i \\ \times \quad 1+i \\ \hline -5i+9i^2 \\ -5+9i \quad -9 \\ \hline -14+4i \end{array}$$

Simplify

1. $i^{10} + i^{25}$
2. $(2 + 3i) - (4 - 4i)$
3. $(2 + 7i) + (-3 - i)$
4. $i^3(4 - 3i)$
5. $(i - 7)(-i + 7)$
6. $\frac{4 + 2i}{5 - 2i}$
7. $\frac{5 + i}{1 - \sqrt{2}i}$

$x = 3 \quad x = 5$

Write equations with complex roots:

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$$x^2 - 8x + 15 = 0$$

$$(x-3)(x-5) = 0$$

$$x-3=0 \qquad x-5=0$$

$$x=3 \qquad x=5$$

$$x^2+4=0$$

$$\longrightarrow (x-2i)(x+2i)=0$$

$$x-2i=0 \qquad x+2i=0$$

$$x=2i \qquad x=-2i$$

$$x-2i$$

$$x+2i$$

$$x^2 \quad 2ix \quad -2ix \quad -4(-1)$$

$$x^2+4$$

$$x^2 - 6x + 10 = 0$$

$$(x - 3 - i)(x - 3 + i) = 0$$

$$(x - 3 - i) = 0 \qquad (x - 3 + i) = 0$$

$$x = 3 + i \qquad x = 3 - i$$

$$-3 \; -i \qquad -3 \; -3 \; +i \; +i$$

$$x - 3 - i$$

$$x - 3 + i$$

$$xi - 3i - i \cdot i \; +1$$

$$x^2 - 3x + 9 + 3i$$

$$x^2 - 3x - xi$$

$$x^2 - 6x + 10$$

$$\begin{array}{r} x^2-16x+26 \\ x-2 \\ \hline -2x^2+32x-52 \\ x^3-16x^2+26x \\ \hline x^3-18x^2+58x-52=0 \end{array}$$

$X^3 \ldots = 0$

$(X-2)(X^2-16x+26)=0$

$(x-2)(X-5-i)(x-5+i) = 0$

$x = 2 \quad x = 5+i \quad x = 5-i$

$X-5-i$

$X-5+i$

$x^2 - 5x + 25 \quad -5x \quad ix \quad -5i \quad -i^2 \quad +5i \quad -ix \quad +1$

$x^2-16x+26$

Do:

Conj. partners 1st

iterations

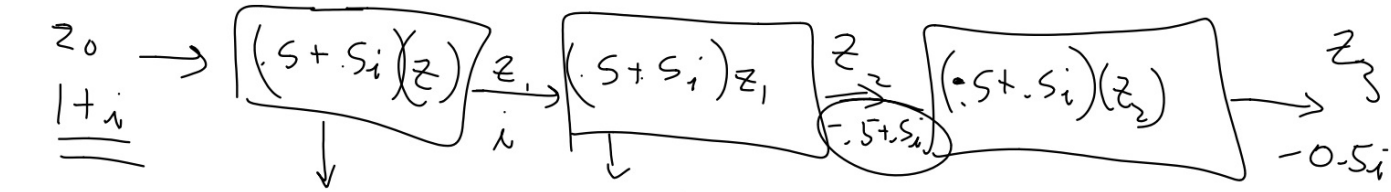
$(f \circ g)(x)$ $(f \circ f)(x)$

4 DYNAMICAL SYSTEMS If $f(z) = (0.5 + 0.5i)z$, find the first five iterates of f for the initial value $z_0 = 1 + i$. Describe any pattern that you see.

$z_1 = i$

$z_2 = -.5 + .5i$

$z_3 = -0.5i$



$$\frac{.5+.5i}{1+i}$$
$$+.5i+.5i^2$$
$$.5+.5i$$
$$i$$

$$\frac{.5+.5i}{i}$$
$$.5i+.5i^2$$
$$-0.5+.5i$$

$$\frac{-.5+.5i}{-.5+.5i}$$
$$.25i-.25i^2$$
$$.25 \quad -.25i$$
$$-.5i$$

Q.5 14-34 e