Trig 9.5

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

real number

imaginary number $\sqrt{neg}$ $x^2+9=0$

complex number $\sqrt{-1}=i$ $\sqrt{x^2}=\sqrt{-9}$

i real + imag $x=\pm 3i$

terms $2+5i$

like terms $0+3i$ $6+0i$

FOIL (boo) $2x+5x$

" "

iteration

conjugate pairs $5+2i$ $5-2i$

$i = \sqrt{-1}$

$i^2 = \sqrt{-1} \cdot \sqrt{-1} = -1$

$i^3 = (i \cdot i) i = -1 i = -i$

$i^4 = \underbrace{i \cdot i \cdot i \cdot i}_{-1 \cdot -1} = 1$

$i^7 = \underbrace{i\,i\,i\,i}_{1}\,\underbrace{i\,i\,i}_{-i} = -i$

1 Simplify each power of i.

a. i^{53}

$i^{53} = i^{52} \cdot i = i$

$(i^4)^{13} \cdot i$

b. $i^{-13} = \frac{1}{i^{13}} \cdot \left(\frac{i^3}{i^3}\right)$

$i^{37} = i^{36} \cdot i = i$

$= \frac{i^3}{i^{16}} = \frac{i^3}{1}$

$= -1\,i = -i$

$a + bi$

like terms

2 **Simplify each expression.**

a. $(5 - 3i) + (-2 + 4i)$ $= i + 3$

$3 + i$

b. $(10 - 2i) - (14 - 6i)$

$-4 + 4i$

EWE

3 Simplify $(2 - 3i)(7 - 4i)$.

$$2 - 3i$$
$$7 - 4i$$

$$-8i \quad 12i^2$$
$$14 \quad -21i \quad -12$$

$$2 - 29i$$

rationalize the denom

5 Simplify $(5 - 3i) \div (1 - 2i)$.

$$\frac{(5-3i)}{(1-2i)} \cdot \frac{(1+2i)}{(1+2i)} = \frac{11+7i}{5} = \frac{11}{5} + \frac{7i}{5}$$

-1

$5-3i$
$1+2i$
$10i$ $-6i^2$
5 $-3i$ 6

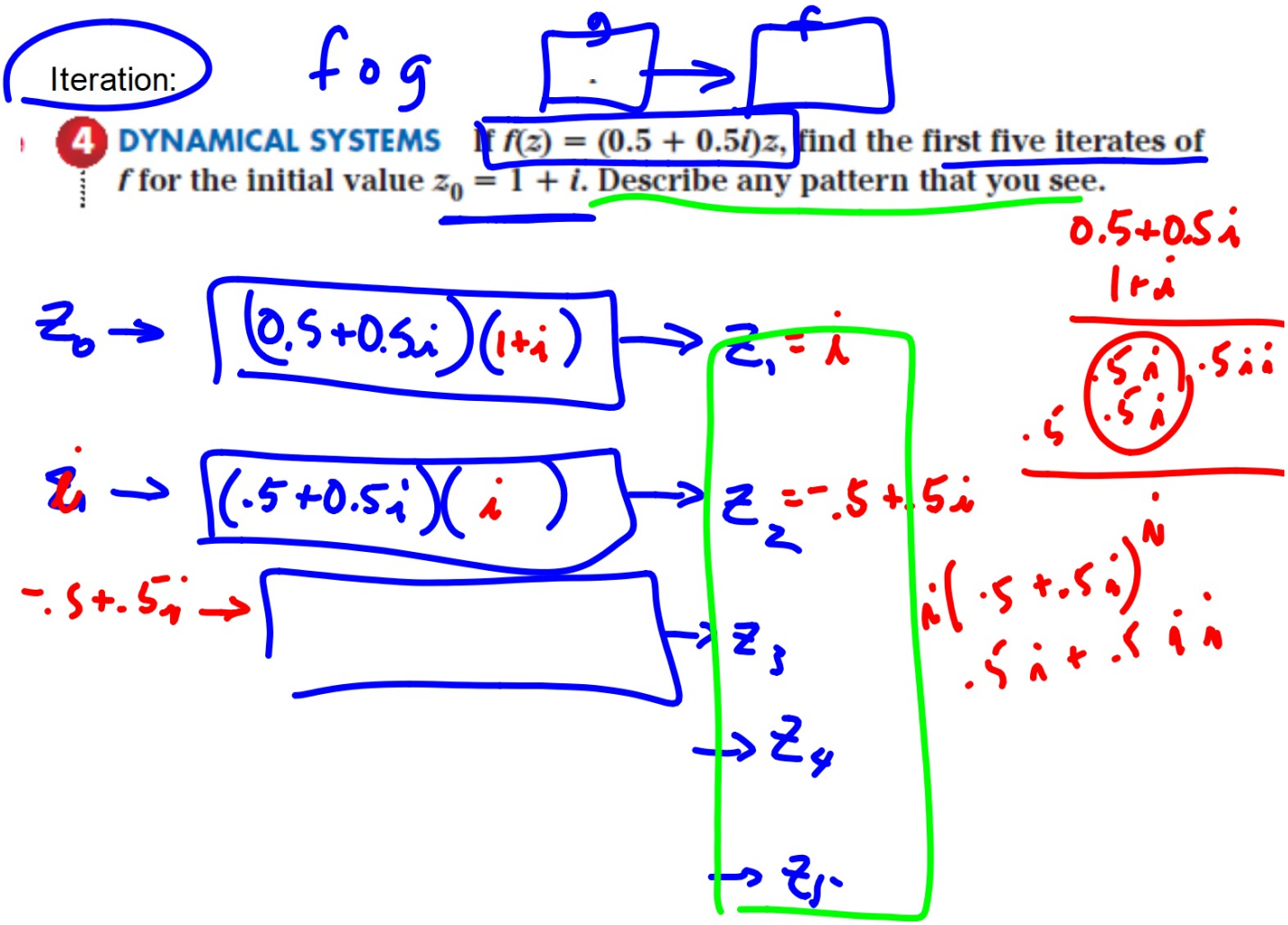
$1-2i$
$1+2i$
1 $-4i^2$

$\frac{12+6i}{3}$

$4+2i$

Iteration: $f \circ g$

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.



$z_1 = i$

$z_2 = -0.5 + 0.5i$ 13-350

$z_3 = -0.5$

$z_4 = -0.25 - 0.25i$

$z_5 = -0.25i$

$z_6 =$