11/1/12 - Ch8 Review

Math 1010

i^{43}

$i^{41} = i$

$i^{42} = -1$

$\boxed{i^{43} = -i}$

$i^{44} = 1$

$i^{45} = i$

$i^{46} = -1$

$i = i^1$

$-1 = i^2$

$-i = i^3$ ←

$1 = i^4$

$4\overline{)43}$ → 10

-4

3

10 R 3

$i^{257} = i$

$4\overline{)257}$ → 64

-24

17

-16

1

8.7

#54

$3i(-3-i)^2$

$3i[(-3-i)(-3-i)]$

$3i[9+3i+3i+i^2]$ ($i^2 = -1$)

$3i(8+6i)$

$24i + 18i^2$ ($i^2 = -1$)

$\boxed{-18+24i}$

60

$$(2-i)^2(2+i)^2 = (2-i)(2-i)(2+i)(2+i)$$
$$= (2-i)(2+i)(2-i)(2+i)$$

$$[(2-i)(2-i)][(2+i)(2+i)]$$

$$[4-2i-2i+\underbrace{i^2}_{(-1)}][4+2i+2i+\underbrace{i^2}_{(-1)}]$$

$$[3-4i][3+4i]$$

$$9+12i-12i-16\underbrace{i^2}_{(-1)}$$

$$9+16$$

$$\boxed{25}$$

Complex # Division

$$\frac{(5+3i)(2+7i)}{(2-7i)(2+7i)} = \frac{10+35i+6i+21\underbrace{i^2}_{(-1)}}{4+14i-14i-49\underbrace{i^2}_{(-1)}}$$

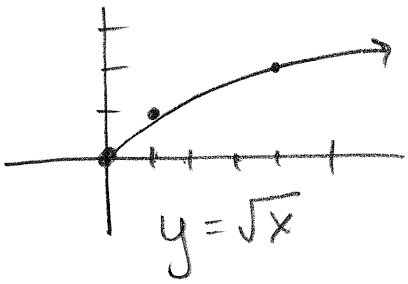
$$= \frac{10-21+41i}{4+49}$$

$$= \frac{-11+41i}{53} = \frac{-11}{53} + \frac{41}{53}i$$

for you

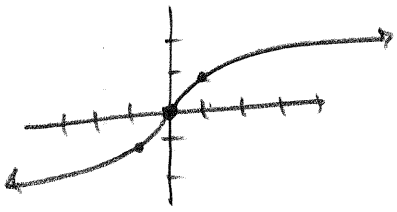
$$\frac{3+2i}{1-4i} = \frac{-5}{17} + \frac{14}{17}i$$

Square Root



$y = \sqrt{x}$

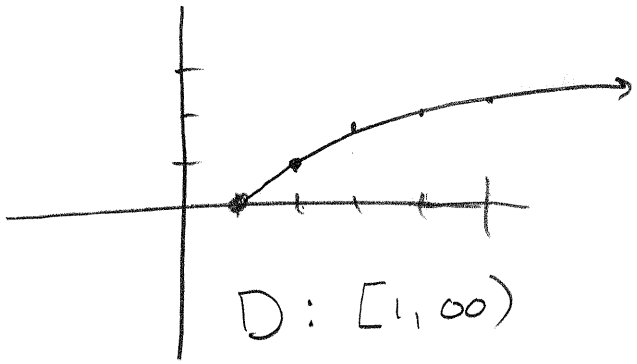
Cube Root



$y = \sqrt[3]{x}$

$y = \sqrt{x-1}$

x	y
0	~~$\sqrt{0-1} = \sqrt{-1}$~~
1	$\sqrt{1-1} = \sqrt{0} = 0$
2	$\sqrt{2-1} = \sqrt{1} = 1$
3	$\sqrt{3-1} = \sqrt{2} = 1.4$
4	$\sqrt{4-1} = \sqrt{3} = 1.7$
5	$\sqrt{5-1} = \sqrt{4} = 2$
6	



D: $[1, \infty)$

R: $[0, \infty)$

$100^{3/2} = 1000$

$\left(\sqrt[2]{100}\right)^3 = 10^3 = 1000$

#100

$$\sqrt{\sqrt{\sqrt{\sqrt{x}}}} = \sqrt[16]{x}$$

$$\left(\left(\left(x^{1/2}\right)^{1/2}\right)^{1/2}\right)^{1/2} = x^{\frac{1}{2}\cdot\frac{1}{2}\cdot\frac{1}{2}\cdot\frac{1}{2}} = x^{1/16}$$

$$\sqrt[3]{x^5} = x\sqrt[3]{x^2}$$

$$\sqrt{\frac{27}{16}} = \frac{\sqrt{27}}{\sqrt{16}} = \boxed{\frac{3\sqrt{3}}{4}}$$

27
3 9
3 3

$$\frac{4}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{4\sqrt{3}}{3}$$

$$\frac{4}{\sqrt[3]{5}} \cdot \frac{\sqrt[3]{5^2}}{\sqrt[3]{5^2}} = \frac{4\sqrt[3]{25}}{5}$$

$$\frac{4}{(1+\sqrt{2})} \cdot \frac{(1-\sqrt{2})}{(1-\sqrt{2})}$$

$$\frac{4(1-\sqrt{2})}{1-\cancel{\sqrt{2}+\sqrt{2}}-2}$$

$$\frac{4(1-\sqrt{2})}{-1}$$

$$-4(1-\sqrt{2})$$

$$-4+4\sqrt{2}$$

$$\sqrt[6]{a^3} = a^{3/6}$$
$$= a^{1/2}$$
$$= \sqrt{a}$$

8.6
#58

$$\left(\sqrt{1+\sqrt{24-10x}}\right)^2 = \left(\sqrt{3x+5}\right)^2$$

$$1+\sqrt{24-10x} = 3x+5$$
$$-1 \qquad\qquad -1$$

$$\left(\sqrt{24-10x}\right)^2 = (3x+4)^2$$
$$(3x+4)(3x+4)$$

$$24-10x = 9x^2+12x+12x+16$$

$$24-10x = 9x^2+24x+16$$
$$-24+10x \qquad +10x \quad -24$$

$$0 = 9x^2+34x-8$$

$$(x+4)(9x-2)$$

$$x+4=0 \qquad 9x-2=0$$

$$x=-4 \qquad x=\tfrac{2}{9}$$

then check

$-72 \mid 34$
$36 \mid 34$
-2

$36/9 \quad -2/9$

$4 \quad 1$