

Unit 5-4: Complex #2 (Part 2) Pg 277

Ex #3: $4x^2 + 256 = 0$

$$\frac{-256 \pm \sqrt{(-256)^2 - 4(4)(0)}}{2(4)}$$

$$\sqrt{x^2} = \sqrt{-64}$$

$$x = \pm \sqrt{-64}$$

$$x = \pm 8i$$

3A)

$$4x^2 + 100 = 0$$

$$\frac{-100 \pm \sqrt{(-100)^2 - 4(4)(0)}}{2(4)}$$

$$\sqrt{x^2} = \sqrt{-25}$$

$$x = \pm \sqrt{-25} = \pm 5i$$

$$x = \pm 5i$$

$$i = \sqrt{-1}$$

$$i^2 = -1$$

$$i^3 = -i$$

$$i^4 = 1$$

Ex #1: $3x + 5 + (y-3)i = 7 + 6i$

Real

$$3x + 5 = 7$$

$$3x = 2$$

$$x = \frac{2}{3}$$

$$x = \frac{2}{3}$$

Imag.

$$y - 3 = 6$$

$$y = 9$$

4) $5x + 1 + (3 + 2y)i = 2 + 4i$

Real

$$5x + 1 = 2$$

$$5x = 1$$

$$x = \frac{1}{5}$$

$$x = \frac{1}{5}$$

Imag

$$3 + 2y = 4$$

$$2y = 1$$

$$y = \frac{1}{2}$$

$$y = \frac{1}{2}$$

Ex #5a) $(5 - i) + (2 + 11i)$

$$7 + 10i$$

b) $(4 - 8i) - (3 - 6i)$

$$4 - 8i - 3 + 6i$$

$$1 - 2i$$

$$1 - 2i$$

5B) $(4 + 6i) - (-1 + 2i)$

$$4 + 6i + 1 - 2i$$

$$5 + 4i$$

$$5 + 4i$$

Ex #6 $V = CT$

$$V = (2 + 4i)(9 - 3i)$$

$$18 - 6i - 36i - 12i^2$$

$$18 + 30i - 12(-1)$$

$$18 + 30i + 12$$

$$30 + 30i$$

$V = CT$

$$(3 - 4i)(3 - 2i)$$

$$9 - 6i - 12i - 8i^2$$

$$9 - 18i - 8(-1)$$

$$9 + 11i - 8$$

$$1 + 11i$$

Ex #7: $\frac{2i}{3 + 4i} \cdot \frac{3 - 4i}{3 - 4i} = \frac{6i - 12i^2}{9 - 16i^2} = \frac{12 + 6i}{9 + 16}$

$$\frac{12 + 6i}{25} = \frac{12}{25} + \frac{6i}{25}$$

$$\frac{12}{25} + \frac{6i}{25}$$

Unit 5-4: Complex #1/2 (Part 2) Pg 277

$$\begin{aligned} i &= \sqrt{-1} \\ i^2 &= -1 \\ i^3 &= -i \\ i^4 &= 1 \end{aligned}$$

EX #3: $4x^2 + 256 = 0$ (3A)

$$\begin{array}{r} -256 \quad -256 \\ \hline 4x^2 = -256 \\ \hline \frac{4x^2}{4} = \frac{-256}{4} \\ \sqrt{x^2} = \sqrt{-64} \\ x = \sqrt{-1 \cdot 8 \cdot 8} \end{array} \quad \begin{array}{r} 4x^2 + 100 = 0 \\ -100 \quad -100 \\ \hline 4x^2 = -100 \\ \hline \frac{4x^2}{4} = \frac{-100}{4} \\ \sqrt{x^2} = \sqrt{-25} = \sqrt{-1 \cdot 5 \cdot 5} \end{array}$$

$x = \pm 8i$ $x = \pm 5i$

EX #1: $3x + 5 + (y-3)i = 7 + 6i$ 4) $5x + 1 + (3+2y)i = 2 + 7i$

<u>Real</u>	<u>Imag.</u>	<u>Real</u>	<u>Imag.</u>
$3x + 5 = 7$	$y - 3 = 6$	$5x + 1 = 2$	$3 + 2y = 7$
$+5 \quad +5$	$+3 \quad +3$	$-2x \quad -2x$	$-9 \quad -9$
$\frac{3x}{3} = \frac{12}{3}$	$y = 9$	$3x + 1 = 2$	$3 + y = 7$
$x = 4$		$-1 \quad -1$	$-3 \quad -3$
		$\frac{3x}{3} = \frac{-3}{3}$	$y = 4$
		$x = -1$	

EX #5a) $(5 - i) + (2 + 11i)$
 $7 + 10i$
 b) $(4 - 8i) - (3 - 6i)$
 $4 - 8i - 3 + 6i$
 $1 - 2i$

5B) $(4 + 6i) - (-1 + 2i)$
 $4 + 6i + 1 - 2i$
 $5 + 4i$

EX #6 $V = CT$
 $V = (2 + 4i)(9 - 3i)$
 $18 - 6i + 36i - 12i^2$
 $18 + 30i - 12(-1)$
 $18 + 30i + 12$

$V = CT$
 $(2 - 4i)(3 - 2i)$
 $6 - 4i - 12i + 8i^2$
 $6 - 16i - 8$
 $-2 - 16i$

EX #7: $\frac{2i(3 - 6i)}{3 + 6i(3 - 6i)} = \frac{6i - 12i^2}{9 - 18i + 18i + 36i^2 + 45} = \frac{12 + 6i}{45 + 36i}$
 $\frac{12 + 6i}{45 + 36i} \cdot \frac{45 - 36i}{45 - 36i} = \frac{12(45 - 36i) + 6i(45 - 36i)}{45^2 - (36i)^2}$
 $\frac{540 - 432i + 270i - 216i^2}{2025 - 1296i^2} = \frac{540 - 162i + 216}{2025 + 1296} = \frac{756 - 162i}{3321}$
 $\frac{756}{3321} - \frac{162i}{3321} = \frac{4}{15} - \frac{2i}{15}$