

September 25, 2015  
 \* Exam #1 - Tuesday  
 Chp. 8  
 Everything Prior

Sep 25-10:08 AM

Complex  
 $i = \sqrt{-1}$   
 $i^2 = -1$  why?  
 $i^2 = i \cdot i$   
 $= \sqrt{-1} \cdot \sqrt{-1}$   
 $= \sqrt{(-1) \cdot (-1)}$   
 $= \sqrt{(-1)^2}$   
 $= -1$   
 $\sqrt{-1} \cdot \sqrt{-1} = -1$   
 $(\sqrt{-1})^2 = -1$

Sep 25-10:12 AM

$\sqrt{-4} \cdot \sqrt{-9} \neq \sqrt{(-4) \cdot (-9)}$   
 Complex numbers  
 $= \sqrt{36}$   
 $= 6$   
 $2i \cdot 3i$   
 $2 \cdot 3 \cdot i \cdot i$   
 $6 \cdot i^2$   
 $6 \cdot (-1)$   
 $-6$

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$\sqrt{-4} \cdot \sqrt{9}$   
 $2i \cdot 3 = 6i$

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$\frac{\sqrt{-50}}{\sqrt{4}} = \frac{5i\sqrt{2}}{2}$  (simplify complex)

Sep 25-10:29 AM

$i = \sqrt{-1}$   
 $i^2 = -1$   
 $i^3 = i^2 \cdot i^1 = (-1) \cdot i = -i \rightarrow -\sqrt{-1}$   
 $i^4 = i^2 \cdot i^2 = (-1) \cdot (-1) = 1$   
 $i^{15} = (i^4)^3 \cdot i^3 = 1^3 \cdot i^2 \cdot i^1 = 1 \cdot (-1) \cdot i = -i$

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$$\left\{ \begin{array}{l} i^1 = \sqrt{-1} \\ i^2 = -1 \\ i^3 = -i \\ i^4 = 1 \end{array} \right.$$

$$i^4 = (i^4)^1 = (1)^1 = \boxed{1} \quad \frac{4}{4} = 1; 0$$

$$i^5 = (i^4)^1 \cdot i^1 = \boxed{1} \cdot i = i \quad \frac{5}{4} = 1; 1 \rightarrow i$$

$$i^6 = (i^4)^1 \cdot i^2 = \boxed{-1} \quad \frac{6}{4} = 1; 2$$

$$i^7 = (i^4)^1 \cdot i^3 = \boxed{-i} \quad \frac{7}{4} = 1; 3$$

$$i^8 = (i^4)^2 \cdot i^0 = 1 \quad \frac{8}{4} = 2; 0$$

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$$i^{43} = (i^4)^{10} \cdot i^3$$

$$= 1 \cdot i^2 \cdot i^1$$

$$\frac{43}{4} = 10; r=3 = -i$$

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$$\frac{i^{109}}{i^{13}} = \frac{i^1}{i^1} = 1$$

$$\frac{109}{4} = 27; r=1$$

$$\frac{13}{4} = 3; r=1$$

Sep 25-10:46 AM