

8.7 Complex #'s

Notes

$$\textcircled{1} \sqrt{-100} \Rightarrow \sqrt{-1} \cdot \sqrt{100}$$

$\sqrt{100} = 10i$
if you know that $\sqrt{-1} = i$

$$\text{So what is } i^2 = (\sqrt{-1})^2 \Rightarrow -1$$

$$\rightarrow i^3 = i \cdot i^2 \Rightarrow -i$$

$$\rightarrow i^4 = i^2 \cdot i^2 \Rightarrow 1$$

$$\rightarrow i^{18} = i^4 \cdot i^4 \cdot i^4 \cdot i^4 \cdot i^2 \Rightarrow -1$$

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

$$\rightarrow i^{20} = (i^4)^5 \Rightarrow 1$$

Simplify 4-5

$$\textcircled{2} \sqrt{-225} \text{ pull out } i \text{ 1st.}$$

$$i\sqrt{225} \Rightarrow 15i$$

$$\textcircled{3} \sqrt{-7} \cdot \sqrt{-15} \Rightarrow i\sqrt{7} \cdot i\sqrt{15}$$

$$i^2 \sqrt{105} \Rightarrow -\sqrt{105}$$

$$\textcircled{4} \sqrt{-10} \cdot \sqrt{2}$$

$$i\sqrt{10} \cdot \sqrt{2} \Rightarrow i\sqrt{20} = 2i\sqrt{5}$$

$$\textcircled{5} \frac{\sqrt{-300}}{\sqrt{100}} \Rightarrow \frac{i\sqrt{300}}{\sqrt{100}} = \sqrt{\frac{300}{100}} = \sqrt{3}$$

$$\textcircled{6} \text{ Add } (7+15i) + (-11+14i)$$

$$-4 + 29i$$

cycles every 4th

Just combine like terms

① Subtract $(-2-3i) - (-5-3i)$
 distribute the negative

$$-2 - 3i + 5 + 3i \Rightarrow \boxed{3}$$

8. $(1+i) + (2+5i) - (3+2i)$

$$\underline{1+i} + \underline{2+5i} - \underline{3-2i}$$

$$\boxed{4i}$$

Multiply

① $(-8i)(-2i) \Rightarrow 16i^2 \Rightarrow \boxed{-16}$

Remember
 $i^2 = -1$

② $3i(4+9i) \Rightarrow 12i + 27i^2$

$$12i - 27 \Rightarrow \boxed{-27 + 12i}$$

③ $(7-2i)(3+i)$

7	$2i$	$7i$
$2i$	$-6i$	$-2i^2$

$$21 + i + 2$$

$$\boxed{23 + i}$$

OR

$$(7-2i)(3+i)$$

$$21 + 7i - 6i - 2i^2$$

$$21 + i + 2$$

$$\boxed{23 + i}$$

Simplify by rationalizing

$$\frac{2}{1+i} \Rightarrow \frac{2(1-i)}{(1+i)(1-i)} \Rightarrow \frac{2-2i}{1-i^2}$$

$$\Rightarrow \frac{2-2i}{1-(-1)} \Rightarrow \frac{2-2i}{2} \Rightarrow \boxed{1-i}$$