Warm Up

#1 $\sqrt{-81}$ $\sqrt{-20}$

#2 $(3+2i)-(2-4i)$ $(1+3i)(1-3i)$ i^6

① $\sqrt{-81}$

$\sqrt{81}\cdot\sqrt{-1}$

$9i$

$\sqrt{-20}$

$\sqrt{20}\cdot\sqrt{-1}$

$2\sqrt{5}\cdot i$

$2i\sqrt{5}$

② $(3+2i)-(2-4i)$

$3+2i-2+4i$

$1+6i$

$(1+3i)(1-3i)$

$1-9i^2$

$1+9$

10

i^6

$i^2\cdot i^2\cdot i^2$

$(-1)(-1)(-1)$

-1

$i^4\cdot i^2$

$(1)(-1)$

-1

Questions from Homework?

④ a) $\frac{(3+i)(1-i)}{(1+i)(1-i)}$

$\frac{3-2i-(i^2)}{1-(i^2)}$

$\frac{4-2i}{2}$

$\boxed{2-i}$

e) $\frac{(2+i\sqrt{5})(1+3i)}{(1-3i)(1+3i)}$

$\frac{2+6i+i\sqrt{5}+3i^2\sqrt{5}}{1-9i^2}$

$\frac{2+6i+i\sqrt{5}-3\sqrt{5}}{10}$

$\frac{2-3\sqrt{5}+(6i+i\sqrt{5})}{10}$

$\boxed{\frac{2-3\sqrt{5}+i(6+\sqrt{5})}{10}}$

⑥ d) $\frac{1}{2}(4-12i)+\frac{3}{4}(8+12i)$

$2-6i+6+9i$

$\boxed{8+3i}$

⑦ a) $(3-i)+(2x+yi)=-2i+6i$

$3-i+2x+yi=0+4i$

$3+2x=0$

$2x=-3$

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

$-i+yi=4i$

$yi=5i$

$\boxed{y=5}$

☆ Recall from yesterday: ☆

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

$$i^2 = -1$$

$$i^3 = i^2 \bullet i = (-1)i = -i$$

$$i^4 = i^2 \bullet i^2 = (-1)(-1) = 1$$

$$i^5 = i^4 \bullet i = (1)i = i$$

$$i^6 = i^4 \bullet i^2 = (1)i^2 = -1$$

$i^1 = i$
$i^2 = -1$
$i^3 = -i$
$i^4 = 1$

You may notice that anytime the exponent is a multiple of 4, the power is 1, so $i^{76} = 1$. Remember that a number is divisble by 4 if the last two digits are divisible by 4.
When the exponent is not a multiple of 4 you can break it down so that part of it is

$$i^{328} = 1$$ (because 328 is a multiple of 4)

$$i^{39} = i^{36} \bullet i^3 = (1)i^3 = -i$$

$(1)(-i)$

$$i^{82} = i^{80} \bullet i^2 = (1)i^2 = -1$$

$(1)(-1)$

Homework