

Warm up

$$\textcircled{1} \sqrt{192}$$

$$\begin{array}{cc} / & \backslash \\ 12 & 16 \\ / & \backslash & / & \backslash \\ 2 & 6 & 4 & 4 \\ / & \backslash & / & \backslash \\ 2 & 3 & 2 & 2 \\ \hline 8 & \sqrt{3} \end{array}$$

$$\textcircled{2} \sqrt{-49} = -\sqrt{-1} \cdot \sqrt{49}$$

$$i \sqrt{49} = 7i$$

$$\begin{array}{c} / & \backslash \\ 7 & 7 \end{array}$$

$$\textcircled{3} (1+5i) + (-8+7i)$$

$$-7 + 12i$$

$$\textcircled{4} (-2+8i) + (4+8i)$$

$$-6 + 16i$$

$\textcircled{5}$ * throwback

$$(2x+5)(4x+1) = 8x^2 + 2x + 20x + 5$$

$$8x^2 + 22x + 5$$

Notes # 4 Multiplying Complex #s

Before:

$$(3x+2)(5x+9) \quad \text{distribute}$$

$$3x(5x+9) + 2(5x+9)$$

*
 $x \cdot x = x^2$

$$15x^2 + 27x + 10x + 18$$

combine like terms

$$15x^2 + 37x + 18 \quad \text{finished}$$

$$(4x-2)(4x+6)$$

$$4x(4x+6) - 2(4x+6)$$

$$16x^2 + 24x - 8x - 12$$

like terms

$$16x^2 + 16x - 12$$

Complex #s

 i complicates this process. ☹️

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

$$x \cdot x = x^2$$

$$i \cdot i = i^2 \star$$

$$\text{mechanics } \sqrt{-1} \cdot \sqrt{-1} \rightarrow \sqrt{-1 \cdot -1} = -1$$

PAIR of -1

$$i^2 = -1$$

this will affect our answer when multiplying

Ex1.

$$(2+9i)(3+5i)$$

$$2(3+5i) + 9i(3+5i) \star$$

$$6 + 10i + 27i + 45i^2 \star$$

like terms

↓

$$\underline{6} + 37i$$

$$\underline{-45}$$

no more i

math magic

$$i^2 = -1$$

$$45 \cdot -1$$

$$-39 + 37i$$

real imaginary

Ex 2. $(4+10i)(1-2i)$

$4(1-2i) + 10i(1-2i)$

$4 - 8i + 10i - 20i^2$ → $-20 \cdot -1$

4 $+ 2i$ +20

$24 + 2i$

try this: $(8-4i)(1+i)$

$8(1+i) - 4i(1+i)$

$8 + 8i - 4i - 4i^2$

8 $+ 4i$ +4

$12 + 4i$

Ex 3. $(5+2i)^2$ **write it twice*

$$(5+2i)(5+2i)$$

$$5(5+2i) + 2i(5+2i)$$

$$25 + 10i + 10i + 4i^2 \star$$

$i^2 = -1$

$$\begin{array}{r} 4 \cdot -1 \\ -4 \end{array}$$

$$\downarrow$$

$$\textcircled{25} + 20i - 4 \text{ no more } i$$

$$21 + 20i$$

real imaginary

try this:

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

$$\textcircled{(4-3i)}\textcircled{(4-3i)}$$

$$16 - 12i - 12i + 9i^2$$

$$\textcircled{16} - 24i \textcircled{-9}$$

$$\textcircled{7-24i}$$

-4 +28i 80i +20i 37
-44 -7 +24i 20
-12i
+3i -28i -10 -45 +52i

