

September 28, 2015
 * Exam #1 - Friday
 Complex Number Form
 $a + bi$
 where a & b are Real numbers & i is imaginary

$5 + 2i$
 $\frac{2-i}{6} \rightarrow \frac{\frac{2}{6} - \frac{1}{6}i}{1}$
 $\frac{2+3i}{6} \rightarrow \frac{\frac{2}{6} + \frac{3}{6}i}{1}$
 $\frac{1}{3} + \frac{1}{2}i$
 $-5 + i\sqrt{6}$
 $\frac{7}{2} + \frac{0}{2}i$
 $\frac{0}{2} + \frac{2}{2}i$

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$i^6 + i^8$ simplify & write in $a+bi$ form.
 $(i^4)^1 \cdot i^2 + (i^4)^2$
 $1 \cdot (-1) + 1$
 $(-1) + 1$
 $0 + 0i$

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$\frac{i^{13}}{i^{33}}$ simplify & write in $a+bi$ form.
 $\frac{(i^4)^3 \cdot i}{(i^4)^8 \cdot i} = \frac{1 \cdot i}{1 \cdot i} = 1$
 $1 + 0i$

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Operations on Complex Numbers
 ① Addition
 $(a + bi) + (c + di)$
 $(a+c) + (b+d)i$

Think
 $(3 + 2x) + (4 + 5x)$
 $3 + 2x + 4 + 5x$
 $(3+4) + (2+5)x$
 $7 + 7x$
 $(3 + 2i) + (4 + 5i)$
 $(3+4) + (2+5)i$
 $7 + 7i$

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$(-3 + 8i) - (2 - i)$
 $-3 + 8i - 2 + i$
 $-5 + 9i$

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② multiplication (only)
 $3i(2 + 5i)$
 $6i + 15i^2$
 $6i + 15(-1)$
 $6i - 15$ not in $a+bi$ form!
 $6i + (-15)$
 $-15 + 6i$

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$$\begin{aligned}
 & \begin{matrix} & F & & O \\ & \swarrow & & \searrow \\ (-2 - 4i) & & (5 + 3i) & \\ & \nwarrow & & \swarrow \\ & I & & L \end{matrix} \\
 & -10 - 6i - 20i - 12i^2 \\
 & -10 - 6i - 20i - 12(-1) \\
 & \boxed{2 - 26i}
 \end{aligned}$$

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③ Division *Think Complex Conjugate Pairs!*

$$\begin{aligned}
 & \frac{2}{(1+3i)} \cdot \frac{(1-3i)}{(1-3i)} \\
 & \text{FOIL} \\
 & \frac{2 - 6i}{1 - 9i^2} = \frac{2 - 6i}{1 - 9(-1)} \\
 & = \frac{2 - 6i}{10} \text{ *Not a tri!* } \\
 & = \frac{2}{10} - \frac{6}{10}i \\
 & = \boxed{\frac{1}{5} - \frac{3}{5}i}
 \end{aligned}$$

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$$\begin{aligned}
 & \frac{5}{-2i} \cdot \frac{+2i}{+2i} = \frac{10i}{-4i^2} = \frac{10i}{4} = \boxed{\frac{5}{2}i} \\
 & \text{or} \\
 & \frac{5}{(0-2i)} \cdot \frac{(0+2i)}{(0+2i)} = \frac{0+10i}{0-4i^2} = \frac{0+10i}{-4(-1)} \\
 & \text{FOIL} \\
 & = \frac{0+10i}{4} \\
 & = \frac{0}{4} + \frac{10}{4}i \\
 & = \boxed{\frac{5}{2}i} \\
 & \text{or} \\
 & \boxed{0 + \frac{5}{2}i}
 \end{aligned}$$

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$$\begin{aligned}
 & \text{FOIL} \\
 & \frac{(3-4i)(5-6i)}{(5+6i)(5-6i)} \\
 & \text{FOIL} \\
 & \frac{15 - 18i - 20i + 24i^2}{25 - 36i^2} \\
 & = \frac{-9 - 38i}{61} = \boxed{-\frac{9}{61} - \frac{38}{61}i} \\
 & \text{Do 8.6}
 \end{aligned}$$

Sep 28-10:46 AM