Math in Living C O L O R !!

3.06 Complex Numbers

Intermediate Algebra: One Step at a Time. Page 275- 288: #30

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See Section 3.06, with explanations, examples, and exercises, coming soon!

You may be interested to know that calculators can be used to perform operations on complex numbers. In particular, the following steps (or precautions!) apply to the TI83/84.

Step 1:   Make sure that the calculator is set for complex numbers. You do this by pressing the MODE button at the top of the second column on the calculator. Scroll down to the line that says [REAL   a+bi   re^θi]. Highlight the [a+bi]. Press [ENTER] to lock it in. Press [CLEAR] to exit.

Step 2:   Locate the [i] button just above the [.] key. Press [2nd]   [.] in order to enter the [i].

Step 3:   When calculating, be careful to use parentheses around the complex numbers, especially when multiplying and dividing.

P. 284: 30. $\dfrac{23-11i}{3-i}$

SOLUTION: I recommend that you use your CALCULATOR to solve this one. For the TI83/84, write the problem like this

$$\frac{(23-11i)}{(3-i)} = (23-11i) \text{ Divided by } (3-i)$$

Final answer: $8-i$

Or, you can use the old fashioned algebra method as follows:

The first step is to multiply numerator and denominator by the conjugate of the denominator.

$$\frac{23-11i}{3-i} \bullet \frac{3+i}{3+i}$$

$$\frac{(23-11i)(3+i)}{(3-i)(3+i)}$$

$$\frac{69+23i-33i-11i^2}{9+3i-3i-i^2}$$

$$\frac{69-10i-11\bullet(-1)}{9-(-1)}$$

$$\frac{69-10i+11}{9+1}$$

$$\frac{80-10i}{10}$$

Factor the numerator:

$$\frac{\cancel{10}(8-i)}{\cancel{10}}$$

And reduce the fraction if possible:

$$8-i$$

Notice how nicely this one comes out? Do you think this is the way division of complex numbers usually ends up? The truth is that, like life, math doesn't always come out even. However, sometimes, if we work at it, we can make things nice!! Maybe someone "fixed" this one.