This key should allow you to understand why you choose the option you did (beyond just getting a question right or wrong). More instructions on how to use this key can be found here.

If you have a suggestion to make the keys better, please fill out the short survey here.

Note: This key is auto-generated and may contain issues and/or errors. The keys are reviewed after each exam to ensure grading is done accurately. If there are issues (like duplicate options), they are noted in the offline gradebook. The keys are a work-in-progress to give students as many resources to improve as possible.

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1. **General Comment:** None

2. Simplify the expression below into the form $a + bi$. Then, choose the intervals that a and b belong to.

$$\frac{-27 - 77i}{-2 - 4i}$$

The solution is $[18.1, 2.3]$, which is option B.

A. $a \in [-13.5, -12]$ and $b \in [12.5, 13.5]$ $-12.70 + 13.10i$, which corresponds to forgetting to multiply the conjugate by the numerator and not computing the conjugate correctly.

B. $a \in [17, 19]$ and $b \in [1.5, 2.5]$* $18.10 + 2.30i$, which is the correct option.

C. $a \in [17, 19]$ and $b \in [45.5, 46.5]$ $18.10 + 46.00i$, which corresponds to forgetting to multiply the conjugate by the numerator.

D. $a \in [361, 362.5]$ and $b \in [1.5, 2.5]$ $362.00 + 2.30i$, which corresponds to forgetting to multiply the conjugate by the numerator and using a plus instead of a minus in the denominator.

E. $a \in [12, 14]$ and $b \in [18.5, 20]$ $13.50 + 19.25i$, which corresponds to just dividing the first term by the first term and the second by the second.

General Comment: Multiply the numerator and denominator by the *conjugate* of the denominator, then simplify. For example, if we have $2+3i$, the conjugate is $2-3i$.

3. Simplify the expression below into the form $a + bi$. Then, choose the intervals that a and b belong to.

$$(-5 + 7i)(4 - 6i)$$

The solution is $22 + 58i$, which is option D.

A. $a \in [-63, -61]$ and $b \in [-3, -1]$ $-62 - 2i$, which corresponds to adding a minus sign in the second term.

B. $a \in [-24, -17]$ and $b \in [-46, -37]$ $-20 - 42i$, which corresponds to just multiplying the real terms to get the real part of the solution and the coefficients in the complex terms to get the complex part.

C. $a \in [-63, -61]$ and $b \in [2, 4]$ $-62 + 2i$, which corresponds to adding a minus sign in the first term.

D. $a \in [17, 24]$ and $b \in [55, 59]$* $22 + 58i$, which is the correct option.

E. $a \in [17, 24]$ and $b \in [-61, -57]$ $22 - 58i$, which corresponds to adding a minus sign in both terms.

General Comment: You can treat i as a variable and distribute. Just remember that $i^2 = -1$, so you can continue to reduce after you distribute.