This is the Answer Key for Module 1 Version B.

1. Choose the **smallest** set of Real numbers that the number below belongs to.

$$-\sqrt{\frac{225}{484}}$$

The solution is Rational

A. Not a Real number

B. Integer

C. Irrational

D. Rational

E. Whole

General Comments: The only ways to *not* be a Real number are: dividing by 0 or taking the square root of a negative number. Irrational numbers are more than just square root of 3: adding or subtracting values from square root of 3 is also irrational.

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2. Simplify the expression below and choose the interval the simplification is contained within.

$$17 - 5 \div 16 * 11 - (4 * 19)$$

The solution is -62.438

A. $[-59.1, -58.9]$

Messed up their order of operations.

B. $[310.5, 316.6]$

This is just an arbitrary distractor.

C. $[181.6, 184.8]$

Did not distribute negative correctly.

D. $[-64.9, -62.1]$

* Correct option.

E. $[92.2, 93.8]$

Did not distribute addition and subtraction correctly.

General Comments: While you may remember (or were taught) PEMDAS is done in order, it is actually done as P/E/MD/AS. When we are at MD or AS, we read left to right.

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3. Choose the **smallest** set of Complex numbers that the number below belongs to.

$$\frac{\sqrt{85}}{5} + 7i^2$$

The solution is Irrational

A. Not a Complex Number

B. Pure Imaginary

C. Nonreal Complex

D. Rational

E. Irrational

General Comments: Be sure to simplify $i^2 = -1$. This may remove the imaginary portion for your number.

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

$$(-5 - 2i)(-9 - 10i)$$

The solution is $25.0 + 68.0i$

A. $a \in [21, 26]$ and $b \in [-76, -67]$

Corresponds to adding a minus sign in both terms.

B. $a \in [21, 26]$ and $b \in [61, 71]$

* Correct option.

C. $a \in [41, 48]$ and $b \in [17, 22]$

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.

D. $a \in [58, 67]$ and $b \in [-37, -28]$

Corresponds to adding a minus sign in the second term.

E. $a \in [58, 67]$ and $b \in [26, 36]$

Corresponds to adding a minus sign in the first term.

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

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

$$\frac{-27 + 66i}{-2 - 1i}$$

The solution is $-2.4 - 31.8i$

A. $a \in [-6, 1]$ and $b \in [-165, -154]$

Forgot to multiply the conjugate by the numerator.

B. $a \in [-6, 1]$ and $b \in [-34, -30]$

* Correct option.

C. $a \in [22, 28]$ and $b \in [-28, -16]$

Forgot to multiply the conjugate by the numerator and didn't compute the conjugate correctly

D. $a \in [-17, -7]$ and $b \in [-34, -30]$

Forgot to multiply the conjugate by the numerator and added a plus instead of a minus in the denominator.

E. $a \in [10, 14]$ and $b \in [-68, -63]$

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 $2 - 3i$.
