This is the Answer Key for Module 1 Version A.

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

$$\sqrt{\frac{-2100}{10}}$$

The solution is Not a Real Number

A. Rational

B. Integer

C. Not a Real number

D. Irrational

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.

$$6 - 8 \div 12 * 2 - (14 * 9)$$

The solution is -121.333

A. $[-121.89, -120.73]$

* Correct option.

B. $[-60.38, -59.39]$

This is just an arbitrary distractor.

C. $[131.44, 132.73]$

Did not distribute addition and subtraction correctly.

D. $[-84.07, -83.98]$

Did not distribute negative correctly.

E. $[-120.44, -120.22]$

Messed up their order of operations.

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.

$$\frac{0}{4\pi} + 10i$$

The solution is Pure Imaginary

A. Pure Imaginary

B. Nonreal Complex

C. Not a Complex Number

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.

$$(-10 + 6i)(-9 + 4i)$$

The solution is $66.0 - 94.0i$

A. $a \in [64, 71]$ and $b \in [-98, -92]$

   * Correct option.

B. $a \in [64, 71]$ and $b \in [91, 95]$

   Corresponds to adding a minus sign in both terms.

C. $a \in [112, 115]$ and $b \in [-15, -11]$

   Corresponds to adding a minus sign in the second term.

D. $a \in [89, 96]$ and $b \in [23, 25]$

   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.

E. $a \in [112, 115]$ and $b \in [11, 16]$

   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.

$$\frac{-27 - 22i}{-6 + 5i}$$

The solution is $0.85 + 4.38i$

A. $a \in [0.82, 0.93]$ and $b \in [263, 272]$

   Forgot to multiply the conjugate by the numerator.

B. $a \in [4.47, 4.51]$ and $b \in [-10, -1]$

   Corresponds to just dividing the first term by the first term and the second by the second.

C. $a \in [4.43, 4.46]$ and $b \in [-4, 3]$

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

D. $a \in [51.94, 52.13]$ and $b \in [2, 7]$

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

E. $a \in [0.82, 0.93]$ and $b \in [2, 7]$

   * Correct option.

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 $2 - 3i$.
