This is the Answer Key for Module 1 Version A.

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

$$-\sqrt{\frac{14400}{576}}$$

The solution is Integer

A. Irrational

B. Integer

C. Rational

D. Whole

E. Not a Real number

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.

$$17 - 4 \div 15 * 11 - (3 * 20)$$

The solution is -45.933

A. $[-48, -45.5]$

* Correct option.

B. $[337.8, 340.2]$

This is just an arbitrary distractor.

C. $[-44.3, -42.6]$

Messed up their order of operations.

D. $[217.6, 222]$

Did not distribute negative correctly.

E. $[76.4, 78.4]$

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.

$$\frac{21\pi}{0} + 5i^2$$

The solution is Not a Complex Number

A. Pure Imaginary

B. Irrational

C. Nonreal Complex

D. Rational

E. Not a Complex Number

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.

$$(6 - 2i)(7 - 8i)$$

The solution is $26.0 - 62.0i$

A. $a \in [22, 33]$ and $b \in [58, 65]$

Corresponds to adding a minus sign in both terms.

B. $a \in [56, 60]$ and $b \in [-36, -30]$

Corresponds to adding a minus sign in the first term.

C. $a \in [38, 47]$ and $b \in [15, 21]$

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. $a \in [56, 60]$ and $b \in [32, 35]$

Corresponds to adding a minus sign in the second term.

E. $a \in [22, 33]$ and $b \in [-68, -60]$

* Correct option.

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.

$$\frac{18 - 66i}{4 + 3i}$$

The solution is $-5.04 - 12.72i$

A. $a \in [-132, -125]$ and $b \in [-15, -12]$

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

B. $a \in [8, 14]$ and $b \in [-9, -8]$

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

C. $a \in [-6, -4]$ and $b \in [-15, -12]$

* Correct option.

D. $a \in [-6, -4]$ and $b \in [-322, -316]$

Forgot to multiply the conjugate by the numerator.

E. $a \in [4, 7]$ and $b \in [-25, -19]$

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 $2 - 3i$.
