

To simplify the given expression, we first recognize that raising an expression to the power of 0.5 is mathematically identical to taking its square root ($\sqrt{x} = x^{0.5}$). Rewriting the expression using standard radical notation makes it much easier to analyze:

$$3a\sqrt{6b} + \sqrt{6a^2b} - \sqrt{24a^2b}$$

We can simplify this expression step-by-step by breaking down each radical term to look for perfect squares that can be pulled outside the radical sign:

1. **First Term:** $3a\sqrt{6b}$ is already in its simplest form because neither 6 nor b contains a perfect square factor.
2. **Second Term:** In $\sqrt{6a^2b}$, the variable factor a^2 is a perfect square. Taking its square root allows us to pull it outside the radical as a single a :

$$\sqrt{6a^2b} = \sqrt{a^2 \cdot 6b} = a\sqrt{6b}$$

3. **Third Term:** In $\sqrt{24a^2b}$, we can factor the number 24 into $4 \cdot 6$, where 4 is a perfect square. Combining this with a^2 gives a perfect square grouping of $4a^2$. Pulling its square root ($\sqrt{4a^2} = 2a$) outside the radical leaves:

$$\sqrt{24a^2b} = \sqrt{4a^2 \cdot 6b} = 2a\sqrt{6b}$$

Now, we substitute our simplified terms back into the original algebraic expression:

$$3a\sqrt{6b} + a\sqrt{6b} - 2a\sqrt{6b}$$

Notice that every single term now contains the exact same matching radical part, $\sqrt{6b}$. We can treat this radical group like a common denominator or a single variable unit and factor it completely out of the expression:

$$\sqrt{6b} (3a + a - 2a)$$

Finally, we combine the like terms inside the parentheses ($3a + 1a - 2a = 2a$). Multiplying this back by our radical group gives the final simplified solution: $2a\sqrt{6b}$, which can be cleanly converted back to exponential notation as $2a(6b)^{0.5}$.

CALCULATOR TIPS:

Since the simplified choice must be mathematically identical to the unsimplified question, both expressions will yield the exact same numerical value for whatever random numbers you assign to a and b .

1. Turn on your calculator and type out the original expression exactly as it appears in the question using the alpha variable keys:
 $3A(6B)^{0.5} + (6A^2B)^{0.5} - (24A^2B)^{0.5}$
2. Press the **CALC** button near the top left of your keypad.
3. The calculator screen will ask you to input a value for your first variable. Choose a small, simple prime number to avoid computational overflow errors (e.g., type $A = 2$ and press $=$).
4. Next, it will ask for your second variable. Input another distinct small prime number (e.g., type $B = 3$ and press $=$).
5. Press $=$ one more time, and write down the final decimal value given by the screen.
 - o For $a = 2, b = 3$:

$$3(2)\sqrt{6(3)} + \sqrt{6(2^2)(3)} - \sqrt{24(2^2)(3)} \approx 16.9705$$

6. Now, leave your screen or clear it with **AC** and test the multiple-choice options using those same stored values. Type option (c) into your screen: $2A(6B)^{0.5}$. Press **CALC**, confirm $A = 2$ and $B = 3$, and press $=$.
7. The screen will immediately display **16.9705**. Because no other choice will give you this exact matching decimal, you can confidently select option (c).