Multiplying Radicals Practice

1. When the expression $\sqrt{6}(\sqrt{3}+2\sqrt{12})$ is expanded, the simplest form is

   A) $\sqrt{18}+2\sqrt{72}$ B) $2\sqrt{3}+2\sqrt{18}$ C) $15\sqrt{2}$ D) $11\sqrt{2}$

2. The product of $x\sqrt{11}$ and $3\sqrt{y}$ is $12\sqrt{22}$. Which statement below is true?

   A) The value of x is 9.
   B) The value of y is 2.
   C) The value of x is 15.
   D) The value of y is 11.

3. Which of the following products will simplify to an integer?

   A) $\left(\sqrt{5}+2\right)\left(\sqrt{5}+2\right)$
   B) $\left(\sqrt{2}+1\right)\left(\sqrt{2}-1\right)$
   C) $\left(\sqrt{3}+5\right)^2$
   D) $\left(2\sqrt{2}+\sqrt{3}\right)\left(\sqrt{5}-1\right)$

Use the following information to answer the next question.

$$4\sqrt{15} \ + \ 2\sqrt{3}$$

$7\sqrt{3}$

4. What is an expression for the area of the rectangle?

Use the following information to answer the next question.

Lena was asked to multiply the following:

$$\left(-2\sqrt{10}+7\right)\left(4\sqrt{2}-\sqrt{5}\right)$$

Her work is shown below. Unfortunately, she made an error.

Step 1	$-8\sqrt{20}+2\sqrt{50}+28\sqrt{2}-7\sqrt{5}$
Step 2	$-16\sqrt{5}+50\sqrt{2}+28\sqrt{2}-7\sqrt{5}$
Step 3	$-23\sqrt{5}+50\sqrt{2}+28\sqrt{2}$
Step 4	$-23\sqrt{5}+78\sqrt{2}$

5. Identify and explain her error. Make the correction and give the correct answer.

6. When $5\sqrt{m}\left(3\sqrt{m}-m\right)$ is simplified, the result is

A) $10m\sqrt{m}$

B) $15m^2$

C) $15m-5m\sqrt{m}$

D) $10m-\sqrt{m}$

Multiplying Radicals Practice Solutions

1. When the expression $\sqrt{6}(\sqrt{3}+2\sqrt{12})$ is expanded, the simplest form is

   A) $\sqrt{18}+2\sqrt{72}$ B) $2\sqrt{3}+2\sqrt{18}$ C) $15\sqrt{2}$ D) $11\sqrt{2}$

Solution

$\sqrt{6}(\sqrt{3}+2\sqrt{12})$

= $\sqrt{18}+2\sqrt{72}$

This is not in simplest form because each of the radicands (18 and 72) have factors that are common to the radicand of a perfect square radical.

= $\sqrt{9}\sqrt{2}+2\sqrt{36}\sqrt{2}$

= $3\sqrt{2}+12\sqrt{2}$

= $15\sqrt{2}$

The correct answer is C.

2. The product of $x\sqrt{11}$ and $3\sqrt{y}$ is $12\sqrt{22}$. Which statement below is true?
   A) The value of x is 9.
   B) The value of y is 2.
   C) The value of x is 15.
   D) The value of y is 11.

Solution

When multiplying radicals, multiply the coefficients to determine the coefficient of the product. Therefore, given 3(x) = 12, the value of x is 4. This means that statements A and C are false.

3. Which of the following products will simplify to an integer?

A) $\left(\sqrt{5}+2\right)\left(\sqrt{5}+2\right)$

B) $\left(\sqrt{2}+1\right)\left(\sqrt{2}-1\right)$ Answer

C) $\left(\sqrt{3}+5\right)^2$

D) $\left(2\sqrt{2}+\sqrt{3}\right)\left(\sqrt{5}-1\right)$

Solution

The simplification of A

$$\left(\sqrt{5}+2\right)\left(\sqrt{5}+2\right) = \sqrt{25}+2\sqrt{5}+2\sqrt{5}+4$$

$$= \quad 9+4\sqrt{5}$$

The simplification of B

$$\left(\sqrt{2}+1\right)\left(\sqrt{2}-1\right) = \sqrt{4}-\sqrt{2}+\sqrt{2}-1$$

$$= \quad 1$$

The simplification of C

$$\left(\sqrt{3}+5\right)^2 = \left(\sqrt{3}+5\right)\left(\sqrt{3}+5\right)$$

$$= \quad \sqrt{9}+5\sqrt{3}+5\sqrt{3}+25$$

$$= \quad 28+10\sqrt{3}$$

The simplification of D

$$\left(2\sqrt{2}+\sqrt{3}\right)\left(\sqrt{5}-1\right) = 2\sqrt{10}-2\sqrt{2}+\sqrt{15}-\sqrt{3}$$

Use the following information to answer the next question.

$$4\sqrt{15} \quad + \quad 2\sqrt{3}$$

$7\sqrt{3}$
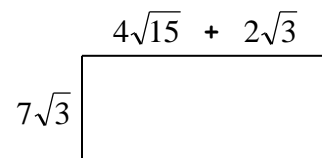
4. What is an expression for the area of the rectangle?

$$7\sqrt{3}\left(4\sqrt{15} + 2\sqrt{3}\right)$$

$$= \quad 28\sqrt{45} + 14\sqrt{9}$$

$$= \quad 28\sqrt{9}\sqrt{5} + 14(3)$$

$$= \quad 84\sqrt{5} + 42$$

Use the following information to answer the next question.

Lena was asked to multiply the following:

$$\left(-2\sqrt{10}+7\right)\left(4\sqrt{2}-\sqrt{5}\right)$$

Her work is shown below. Unfortunately, she made an error.

Step 1	$-8\sqrt{20}+2\sqrt{50}+28\sqrt{2}-7\sqrt{5}$
Step 2	$-16\sqrt{5}+50\sqrt{2}+28\sqrt{2}-7\sqrt{5}$
Step 3	$-23\sqrt{5}+50\sqrt{2}+28\sqrt{2}$
Step 4	$-23\sqrt{5}+78\sqrt{2}$

5. Identify and explain her error. Make the correction and give the correct answer.

Solution

The error is in step 2. The second term should be $10\sqrt{2}$, not $50\sqrt{2}$. From step 1, when $2\sqrt{50}$ is simplified, the first action to take is $2\sqrt{25}\sqrt{2}$. Replace root 25 with its natural number equivalent of 5, and multiply that number by 2.

Step 2 $-16\sqrt{5}+10\sqrt{2}+28\sqrt{2}-7\sqrt{5}$

Step 3 $-23\sqrt{5}+10\sqrt{2}+28\sqrt{2}$

Step 4 $-23\sqrt{5}+38\sqrt{2}$

The correct answer is $-23\sqrt{5}+38\sqrt{2}$.

6. When $5\sqrt{m}\left(3\sqrt{m}-m\right)$ is simplified, the result is

A) $10m\sqrt{m}$

B) $15m^2$

C) $15m-5m\sqrt{m}$ **Answer**

D) $10m-\sqrt{m}$

Solution

Remember that when any two identical radicals are multiplied, the result is **just** the radicand. Thus, $\sqrt{m}X\sqrt{m}=m$

$5\sqrt{m}\left(3\sqrt{m}-m\right)$ = $15m-5m\sqrt{m}$

The correct answer is C.