Mixed and Entire Radicals Practice

1. Which of the following is the smallest perfect square radical?

   A) $\sqrt{20}$ B) $\sqrt{36}$ C) $\sqrt{144}$ D) $\sqrt{300}$

2. When $\sqrt{128}$ is converted to a mixed radical in the simplest form of $k\sqrt{2}$, the value of k is ___.

3. When the radicals $\sqrt{m}$ and $\sqrt{20}$ are multiplied, the value is $\sqrt{60}$. The value of m is

   A) 3 B) 40 C) 6 D) 80

4. The simplified answer to $\sqrt{14m}$ X $\sqrt{14m}$ is _____.

5. When $5\sqrt{3}$ is converted to an entire radical, the value of the radicand is

   A) 15 B) 45 C) 75 D) 100

6. Convert $-8\sqrt{20}$ to a mixed radical in simplest form.

7. Given $9\sqrt{68}$, which statement is true?

   A) When converting to a mixed radical in simplest form, re-write as $(9)(4)(\sqrt{17})$.
   B) When converting to an entire radical, re-write as $\sqrt{9}X\sqrt{68}$.
   C) It is already in simplest form.
   D) As a mixed radical, it is equal to $18\sqrt{17}$.

8. Simplify the following:

a) $2\sqrt{30} X 3\sqrt{10}$

b) $-12\sqrt{2} X \sqrt{11}$

c) $5\sqrt{7} X 2\sqrt{7}$

Mixed and Entire Radicals PracticeSolutions

1. Which of the following is the smallest perfect square radical?

   A) $\sqrt{20}$ B) $\sqrt{36}$ C) $\sqrt{144}$ D) $\sqrt{300}$

Solution

B and C are perfect squares. The square root of 36 is 6 and the square root of 144 is 12. The smallest perfect square is B) $\sqrt{36}$.

2. When $\sqrt{128}$ is converted to a mixed radical in the simplest form of $k\sqrt{2}$, the value of k is _8__.

Solution

The radicand, 128, has a perfect square factor of 64. Thus, $\sqrt{128} = \sqrt{64}X\sqrt{2}$.

Replace $\sqrt{64}$ with its integer equivalent of 8. $\sqrt{128} = (8)\sqrt{2}$. The value of k is 8.

3. When the radicals $\sqrt{m}$ and $\sqrt{20}$ are multiplied, the value is $\sqrt{60}$. The value of m is

   A) 3 B) 40 C) 6 D) 80

Solution

The multiplication property of radicals states $\sqrt{a}X\sqrt{b} = \sqrt{ab}$. Since (m)(20) = 60, m is $\frac{60}{20} or 3$

4. The simplified answer to $\sqrt{14m}$ X $\sqrt{14m}$ is _14m_.

Solution

The product of any two identical radicals is **just** the radicand.

5. When $5\sqrt{3}$ is converted to an entire radical, the value of the radicand is

A) 15 B) 45 C) 75 D) 100

Solution

The coefficient is 5. Square it and put the result under a radical sign.

$5\sqrt{3} = \sqrt{25}X\sqrt{3}$

Use the multiplication property for radicals, to multiply the radicands, and put the result under a radical sign.

$5\sqrt{3} = \sqrt{75}$

6. Convert $-8\sqrt{20}$ to a mixed radical in simplest form.

Solution

The key question: Are there any factors of the radicand, 20 in this case, that are common to any radicands for a perfect square?

Yes. One factor of 20 is 4, and $\sqrt{4} = 2$.

Re-write the original term as:

$-8\sqrt{20} = -8\sqrt{4}X\sqrt{5}$

Replace the square root of 4 with its integer equivalent.

$-8\sqrt{20} = (-8)(2)\sqrt{5}$

Multiply the two integers.

The final answer is $-8\sqrt{20} = -16\sqrt{5}$.

7. Given $9\sqrt{68}$, which statement is true?

   A) When converting to a mixed radical in simplest form, re-write as $(9)(4)(\sqrt{17})$.
   B) When converting to an entire radical, re-write as $\sqrt{9}X\sqrt{68}$.
   C) It is already in simplest form.
   D) As a mixed radical, it is equal to $18\sqrt{17}$.

Solution

A is false because it should be $(9)(\sqrt{4})(\sqrt{17})$.

B is false because it should be $\sqrt{81}X\sqrt{68}$.

C is false because it is not in simplest form. We know this because 68 has a factor that is a radicand of a perfect square, i.e. 4.

D is true. $9\sqrt{68} = (9)(\sqrt{4})(\sqrt{17})$, which is equal to,

$9\sqrt{68} = (9)(2)(\sqrt{17})$, which is equal to,

$9\sqrt{68} = 18(\sqrt{17})$

8. Simplify the following:
   a) $2\sqrt{30}X3\sqrt{10}$

Solution

Multiply the coefficients and then multiply the radicals.

= $6\sqrt{300}$

Since 300 has a factor (i.e. 100) that is the same as the radicand of a perfect square factor, we can re-write:

$6\sqrt{100}\sqrt{3}$

Replace the square root of 100 with its integer equivalent of 10.

= $6(10)\sqrt{3}$

The final answer is $60\sqrt{3}$.

b) $-12\sqrt{2}X\sqrt{11}$

Solution

The coefficients are -12 and 1. Multiply these numbers to get -12.

The product of the two radicals is $\sqrt{22}$

To get the final answer, multiply the integer by the radical.

The final answer is $-12\sqrt{22}$.

c) $5\sqrt{7}X\,2\sqrt{7}$

Solution

Multiply the coefficients and multiply the radicals. Remember, that multiplying any two identical radicals, will result in **just** the radicand.

= (5)(2)(7)

= 70