Topic: Dividing radicals

Question: Simplify the expression.

$$\sqrt{\frac{6}{23}} \cdot \frac{\sqrt{23}}{\sqrt{23}}$$

Answer choices:

A $\frac{\sqrt{111}}{2}$

B $\frac{\sqrt{23}}{118}$

C $\frac{\sqrt{138}}{23}$

D $\frac{23}{6}$

Solution: C

When we have the square root of a fraction, we want to rewrite it as the quotient of the square roots of the numbers in the numerator and denominator.

$$\sqrt{\frac{6}{23}} \cdot \frac{\sqrt{23}}{\sqrt{23}}$$

$$\frac{\sqrt{6}}{\sqrt{23}} \cdot \frac{\sqrt{23}}{\sqrt{23}}$$

Then, as usual, we multiply the two fractions by multiplying the numerators separately from the denominators.

$$\frac{\sqrt{6}\sqrt{23}}{\sqrt{23}\sqrt{23}}$$

$\sqrt{23}$ multiplied by itself will give us just 23 in the denominator.

$$\frac{\sqrt{6}\sqrt{23}}{23}$$

To get the product of square roots in the numerator, $\sqrt{6}\sqrt{23}$, we can rewrite it as the square root of the product of the radicands (as $\sqrt{6 \cdot 23}$).

$$\frac{\sqrt{6 \cdot 23}}{23}$$

$$\frac{\sqrt{138}}{23}$$

Topic: Dividing radicals

Question: Rationalize the denominator.

$$\frac{\sqrt[4]{96}}{\sqrt[4]{6}}$$

Answer choices:

A $2\sqrt{2}$

B 4

C 16

D 2

Solution: D

Both the numerator and denominator are raised to the same power (the fourth root), so the expression can be rewritten as the fourth root of their quotient.

$$\frac{\sqrt[4]{96}}{\sqrt[4]{6}}$$

$$\sqrt[4]{\frac{96}{6}}$$

Then, since $96/6 = 16$, we get

$$\sqrt[4]{16}$$

$$2$$

Topic: Dividing radicals

Question: Simplify the expression.

$$\frac{\sqrt{27}}{\sqrt{3}}$$

Answer choices:

A 3

B 9

C $3\sqrt{3}$

D 27

Solution: A

When we have a fraction in which the numerator is a root and the denominator is a root, we can put the fraction under one root instead.

$$\frac{\sqrt{27}}{\sqrt{3}}$$

$$\sqrt{\frac{27}{3}}$$

Then, since $27/3 = 9$, we get

$$\sqrt{9}$$

$$3$$