1. Evaluate the expression.

(a) \( \sqrt[3]{27} = \sqrt[3]{3^3} \) which is of the form \( \sqrt[3]{a^n} \) with \( n \) odd, hence \( \sqrt[3]{3^3} = 3 \).

(b) \( \sqrt{100} = \sqrt{10^2} \) which is of the form \( \sqrt{a^n} \) with \( n \) even, therefore \( \sqrt{10^2} = 10 \).

2. Simplify. \((-xy)^2 \cdot (5xy)^0\)

Recall that \( (ab)^n = a^n b^n \). Therefore \((-xy)^2 = (-1)^2 (x^2)(y^2)\).

Furthermore, anything raised to 0 is 1, therefore \((-xy)^2 \cdot (5xy)^0 = x^4 y^4\).

3. Simplify and state the domain.

\( \sqrt{\frac{4x}{9}} \cdot \sqrt{\frac{9}{x}} \) has no domain restrictions, but \( \sqrt{\frac{9}{x}} \) does, since we cannot divide by 0, and we can't take the square root of a negative, so \( x > 0 \). Recalling that for \( a, b > 0 \), \( \sqrt{a} \cdot \sqrt{b} = \sqrt{ab} \), we find that \( \sqrt{\frac{4x}{9}} \cdot \sqrt{\frac{9}{x}} = \sqrt{\frac{4x \cdot 9}{9 \cdot x}} = \sqrt{4} = 12 \) for \( x > 0 \).

4. Perform the operation and write your answer in the simplest form.

\( \frac{1-x}{3} + \frac{2x}{9} \) for \( x > 0 \).

Since \( x > 0 \), we have \(-x < 0\). Recall that \( |x| = \begin{cases} x, & \text{if } x \geq 0 \\ -x, & \text{if } x < 0 \end{cases} \).

Since the part inside the absolute value is negative, by definition it follows that \( |-x| = -(-x) = x \). Then \( \frac{1-x}{3} + \frac{2x}{9} = \frac{3x + 2x}{9} = \frac{5x}{9} \).

Show your work. Circle or Box your answers.
1. Evaluate the expression.

(a) \( \sqrt{8} = \sqrt[3]{2^3} \) which is of the form \( \sqrt[n]{a^n} \) with \( n \) odd.

\[
\sqrt{8} = \sqrt[3]{2^3} = 2.
\]

Therefore

(b) \( \sqrt{100} = \sqrt{10^2} \) which is of the form \( \sqrt[n]{a^n} \) with \( n \) even.

\[
\sqrt{100} = \sqrt{10^2} = 101.
\]

Therefore

2. Simplify. \((-xy)^2 \cdot (14xy)^0\)

Recall that \((ab)^n = a^n b^n\). Therefore \((-xy)^2 = (-1)^2 (x^2)(y^2) = x^2y^2\). Anything raised to 0 is 1. Hence,

\[
(-xy)^2 \cdot (14xy)^0 = x^2y^2.
\]

3. Simplify and state the domain.

\(\sqrt{\frac{9x}{16}} \cdot \sqrt{\frac{16}{x}}\) has no domain restrictions, but \(\sqrt{\frac{16}{x}}\) does. We can't divide by 0, and we can't take the square root of a negative number.

So we have \(x > 0\) as our restriction. Recall that for \(a, b > 0\), \(\sqrt{a} \cdot \sqrt{b} = \sqrt{ab}\).

Then we find that \(\sqrt{\frac{9x}{16}} \cdot \sqrt{\frac{16}{x}} = \sqrt{\frac{9x \cdot 16}{16x}} = \sqrt{9} = 3\) with \(x > 0\).

4. Perform the operation and write your answer in the simplest form.

\(\frac{|-x|}{6} + \frac{5x}{12}\) for \(x > 0\).

Since \(x > 0\), we have \(-x < 0\). Recall that \(|x| = \begin{cases} x, & \text{if } x > 0 \\ -x, & \text{if } x < 0 \end{cases}\).

Since the part inside the absolute value is negative, by definition it follows that \(1 - x\) is negative, so \(\frac{1 - x}{6} + \frac{5x}{12}\) must be negative. Then

\[
\frac{|-x|}{6} + \frac{5x}{12} = \frac{x}{6} + \frac{5x}{12} = \frac{2x + 5x}{12} = \frac{7x}{12}.
\]