

Answer on Question #48710 – Math – Algebra

$$\sqrt{\frac{3ab^{-3} - b^2}{12a^{3b}}}$$

Solution:

To begin, we rewrite the numerator.

$$\sqrt{\frac{3ab^{-3} - b^2}{12a^{3b}}} = \sqrt{\frac{3a}{b^3} - b^2} = \sqrt{\frac{3a - b^5}{b^3}}$$

As the result of our calculation we obtained the following expression.

$$\sqrt{\frac{3ab^{-3} - b^2}{12a^{3b}}} = \sqrt{\frac{3a - b^5}{12a^{3b}b^3}}$$

Next, we can extract from the root of the denominator.

$$\sqrt{\frac{3a - b^5}{12a^{3b}b^3}} = \frac{\sqrt{\frac{a^{-3b}(3a - b^5)}{b^3}}}{2\sqrt{3}}$$

We extract a negative sign in the expression with radicand.

$$\frac{\sqrt{\frac{a^{-3b}(3a - b^5)}{b^3}}}{2\sqrt{3}} = \frac{\sqrt{\frac{-a^{-3b}(b^5 - 3a)}{b^3}}}{2\sqrt{3}}$$

Now we can we extract the monomial a^{-3b} of the radicand. Now we can write.

$$(a^{-3b})^{\frac{1}{2}} = a^{-\frac{3b}{2}}$$
$$\frac{\sqrt{\frac{-a^{-3b}(b^5 - 3a)}{b^3}}}{2\sqrt{3}} = \frac{a^{-\frac{3b}{2}}}{2} \sqrt{-\left(\frac{b^5}{3b^3} - \frac{3a}{3b^3}\right)}$$

Finally we obtained the following result.

$$\frac{a^{-\frac{3b}{2}}}{2} \sqrt{-\left(\frac{b^5}{3b^3} - \frac{3a}{3b^3}\right)} = \frac{1}{2} a^{-\frac{3b}{2}} \sqrt{\frac{a}{b^3} - \frac{b^2}{3}}$$