Bellwork Alg Friday, January 31, 2020

1. Simplify. Make sure answer has a rationalized denominator. Simplify your answer. Assume all variables are positive quantities.

a) $\frac{12}{8+\sqrt{7}}$ b) $\frac{24c^4}{\sqrt{8c^7d^{13}}}$ c) $\frac{\sqrt[3]{16y^2}}{\sqrt[3]{6x^{13}y^9}}$

2. Simplify. Use absolute value symbols where necessary.

a) $\sqrt[4]{162a^{13}b^{34}}$ b) $\sqrt[5]{96c^{17}d^{24}}$

3. Simplify. Give your answer in simplified radical form. Make sure there are no decimals in your answers. Assume all variables are positive quantities.

$$\left(\frac{9P^{-10}Q^{-2}}{9^{-1}P^{-2}Q^4}\right)^{-\frac{3}{4}}$$

4. Simplify each. Assume all variables are positive quantities.

a) $(6-2\sqrt{3})(5+8\sqrt{3})$ b) $\sqrt{55g^{13}h^5}\cdot\sqrt{15g^6h^9}$

Bellwork Alg Friday, January 31, 2020 ANSWERS

1. Simplify. Make sure answer has a rationalized denominator. Simplify your answer. Assume all variables are positive quantities.

a) $\frac{12}{8+\sqrt{7}} \cdot \frac{8-\sqrt{7}}{8-\sqrt{7}} = \frac{12(8-\sqrt{7})}{57} = \frac{4(8-\sqrt{7})}{19}$ or $\frac{32-4\sqrt{7}}{19}$

	8	$-\sqrt{7}$
8	64	$-8\sqrt{7}$
$+\sqrt{7}$	$+8\sqrt{7}$	-7

$= 57$

b) $\frac{24c^4}{\sqrt{8c^7d^{13}}} \cdot \frac{\sqrt{2cd}}{\sqrt{2cd}} = \frac{24c^4\sqrt{2cd}}{\sqrt{16c^8d^{14}}} = \frac{24c^4\sqrt{2cd}}{4c^4d^7} = \frac{6\sqrt{2cd}}{d^7}$

c) $\frac{\sqrt[3]{16y^2}}{\sqrt[3]{6x^{13}y^9}} = \frac{\sqrt[3]{8}}{\sqrt[3]{3x^{13}y^7}} = \frac{2}{\sqrt[3]{3x^{13}y^7}} \cdot \frac{\sqrt[3]{3^2x^2y^2}}{\sqrt[3]{3^2x^2y^2}} = \frac{2\sqrt[3]{9x^2y^2}}{\sqrt[3]{3^3x^{15}y^9}}$

$= \frac{2\sqrt[3]{9x^2y^2}}{3x^5y^3}$

2. Simplify. Use absolute value symbols where necessary.

a) $\sqrt[4]{162a^{13}b^{34}} = \sqrt[4]{81 \cdot 2\, a^{13}b^{34}}$

$2^4 = 16$
$3^4 = 81$
$4^4 = 256$

$= 3|a^3|b^8\sqrt[4]{2ab^2}$

b) $\sqrt[5]{96c^{17}d^{24}} = \sqrt[5]{32 \cdot 3\, c^{17}d^{24}}$

$2^5 = 32$
$3^5 = 243$

$= 2c^3d^4\sqrt[5]{3c^2d^4}$

3. Simplify. Give your answer in simplified radical form. Make sure there are no decimals in your answers. Assume all variables are positive quantities.

$$\left(\frac{9P^{-10}Q^{-2}}{9^{-1}P^{-2}Q^{4}}\right)^{-\frac{3}{4}}$$

move all bases w/ neg exp and simplify inside ( )

$$= \left(\frac{9 \cdot 9^{1} P^{2}}{P^{10} Q^{2} Q^{4}}\right)^{-3/4}$$

$$= \left(\frac{81 P^{2}}{P^{10} Q^{6}}\right)^{-3/4}$$

$$= \left(\frac{81}{P^{8} Q^{6}}\right)^{(-3/4)}$$ flip fraction

$$= \left(\frac{P^{8} Q^{6}}{81}\right)^{3/4}$$

apply exponent outside ( )

$$= \frac{P^{8 \cdot 3/4} Q^{6 \cdot 3/4}}{81^{3/4}}$$

$$= \frac{P^{6} Q^{\frac{9}{2}}}{(\sqrt[4]{81})^{3}}$$

$$= \frac{P^{6} \sqrt{Q^{9}}}{(3)^{3}} = \boxed{\frac{P^{6} Q^{4} \sqrt{Q}}{27}}$$

4. Simplify each. Assume all variables are positive quantities.

a) $(6 - 2\sqrt{3})(5 + 8\sqrt{3})$

	6	$-2\sqrt{3}$
5	30	$-10\sqrt{3}$
$+8\sqrt{3}$	$+48\sqrt{3}$	$-16 \cdot 3 = -48$

$$= \boxed{-18 + 38\sqrt{3}}$$

b) $\sqrt{55g^{13}h^{5}} \cdot \sqrt{15g^{6}h^{9}}$

5·11 5·3

$$= \sqrt{25 \cdot 33 g^{19} h^{14}}$$

$$= \boxed{5 g^{9} h^{7} \sqrt{33 g}}$$