Warm up

1. $(-3x^{-4}y^5)^2(3x^{-2}y^{-3})(\cancel{x}^0y^4)^{-1}$

$9x^{-8}y^{10}\cdot 3x^{-2}y^{-3}\cdot y^{-4}$

$\frac{27y^3}{x^{10}}$

2. $\frac{3(xy^{-4})^2}{x^{-5}y^{-1}} = \frac{3x^2y^{-8}}{x^{-5}y^{-1}} = \frac{3x^7}{y^7}$

PRODUCT RULE:

$\sqrt[a]{x}\cdot\sqrt[a]{y} = \sqrt[a]{xy}$

Example:

$\sqrt{10}\cdot\sqrt{x} = \sqrt{10x}$

QUOTIENT RULE:

$\frac{\sqrt[a]{x}}{\sqrt[a]{y}} = \sqrt[a]{\frac{x}{y}}$

Example:

$\frac{\sqrt{10}}{\sqrt{2}} = \sqrt{\frac{10}{2}} = \sqrt{5}$

Simplify by rewriting the following using only one radical sign.

1. $\sqrt{7x}\cdot\sqrt{2y}$

$\sqrt{14xy}$

2. $\frac{\sqrt[3]{12x^2}}{\sqrt[3]{4x}} = \sqrt[3]{\frac{12x^2}{4x}}$

$\sqrt[3]{3x}$

Simplify by rewriting the following using multiple radicals.

3. $\sqrt{\frac{144}{25}} = \frac{\sqrt{144}}{\sqrt{25}}$

$\frac{12}{5}$

4. $\sqrt{\frac{x^6}{121}} = \frac{\sqrt{x^6}}{\sqrt{121}}$

$\frac{x^3}{11}$

Express each radical in simplified form.

5. $\sqrt{48}$

$\sqrt{16\cdot 3}$

$\sqrt{16}\sqrt{3}$

$\boxed{4\sqrt{3}}$

6. $\sqrt{450x^4y^5}$

$\boxed{yy}\boxed{yy}y$

$y^2\sqrt{y}$

$\sqrt{225\cdot 2x^4y^5}$

$\boxed{15x^2y^2\sqrt{2y}}$

perfect cubes→

7. $\sqrt[3]{48a^7b^3}$

$\sqrt[3]{8\cdot 6a^7b^3}$

$\boxed{2a^2b\sqrt[3]{6a}}$

Perfect cubes

$2^3=8$

$3^3=27$

$4^3=64$

$5^3=125$

$6^3=216$

8. $\sqrt[4]{80a^{10}b^3}$

$2^4=16$

$3^4=81$

$\sqrt[4]{16\cdot 5a^{10}b^3}$

$2a^2\ \sqrt[4]{5a^2b^3}$

9. $-\sqrt{675m^4n^{11}p^5}$

$-\sqrt{225\cdot 3m^4n^{11}p^5}$

$-15m^2n^5p^2\sqrt{3np}$

10. $\sqrt[3]{-27x^5}$

*an odd root of a - # is a - answer

$\boxed{-3x\sqrt[3]{x^2}}$

11. $\sqrt{6x}\cdot\sqrt{12x}$

$\sqrt{72x^2}$

$\sqrt{36\cdot 2\cdot x^2}$

$\boxed{6x\sqrt{2}}$

12. $\sqrt{12a^3b^5}\cdot\sqrt{6ab^2}$

$\sqrt{\underset{36\cdot 2}{72}a^4b^7} = \boxed{6a^2b^3\sqrt{2b}}$

To add or subtract, you must have the same radicand + index # (root)

Simplify. Assume all variables represent positive real numbers.

13. $\underline{5\sqrt{3}} + \underline{1\sqrt{2}} - \underline{2\sqrt{3}} + \underline{4\sqrt{2}}$

$\boxed{3\sqrt{3} + 5\sqrt{2}}$

14. $2\sqrt{\underset{4\cdot 3}{12}} + \sqrt{18} + 2\sqrt{3} - 3\sqrt{\underset{4\cdot 2}{8}}$

$2\cdot 2\sqrt{3} +$ $\qquad -3\cdot 2\sqrt{2}$

$\underline{4\sqrt{3}} + \underline{3\sqrt{2}} \underline{+2\sqrt{3}} \underline{-6\sqrt{2}}$

$\boxed{6\sqrt{3} - 3\sqrt{2}}$

15. $2\sqrt{6}(3\sqrt{2} - 5\sqrt{3})$

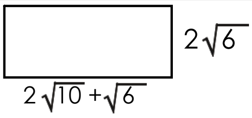
$6\sqrt{12} - 10\sqrt{18}$

$6\sqrt{4\cdot 3} - 10\sqrt{9\cdot 2}$

$6\cdot 2\sqrt{3} - 10\cdot 3\sqrt{2}$

$\boxed{12\sqrt{3} - 30\sqrt{2}}$

16.



a. perimeter

$P = 2L + 2W$

$P = 2(2\sqrt{10} + \sqrt{6}) + 2(2\sqrt{6})$

$P = 4\sqrt{10} + 2\sqrt{6} + 4\sqrt{6}$

$\boxed{P = 4\sqrt{10} + 6\sqrt{6}}$

b. area

$A = LW$

$A = 2\sqrt{6}(2\sqrt{10} + \sqrt{6})$

$A = 4\sqrt{60} + 2(6)$

$A = 4\sqrt{4\cdot 15} + 12$

$\boxed{A = 8\sqrt{15} + 12}$

Simplify. Assume all variables represent positive real numbers and rationalize all denominators.

17. $\frac{3}{\sqrt{5}}\cdot\frac{\sqrt{5}}{\sqrt{5}}$

$\boxed{\frac{3\sqrt{5}}{5}}$

18. $\frac{3}{(4-\sqrt{5})}\cdot\frac{(4+\sqrt{5})}{(4+\sqrt{5})}$

conjugate

$\frac{12+3\sqrt{5}}{16+\cancel{4\sqrt{5}-4\sqrt{5}}-5}$

$\boxed{\frac{12+3\sqrt{5}}{11}}$

19. $\sqrt{\frac{16}{27}} = \frac{\sqrt{16}}{\sqrt{27}}$

$\frac{4}{3\sqrt{3}}\cdot\frac{\sqrt{3}}{\sqrt{3}} = \boxed{\frac{4\sqrt{3}}{9}}$