 Name_____

Simplifying Radicals

Date_____ Period____

Simplify. Use absolute value signs when necessary.

1) $\sqrt{24}$

$2\sqrt{6}$

2) $\sqrt[3]{1000}$

10

3) $\sqrt[3]{-162}$

$-3\sqrt[3]{6}$

4) $\sqrt{512}$

$16\sqrt{2}$

5) $\sqrt[4]{128n^8}$

$2n^2\sqrt[4]{8}$

6) $\sqrt{98k}$

$7\sqrt{2k}$

7) $\sqrt[5]{224r^7}$

$2r\sqrt[5]{7r^2}$

8) $\sqrt[3]{24m^3}$

$2m\sqrt[3]{3}$

Disregard absolute value symbols when checking your answers.

9) $\sqrt{392x^2}$

$14|x|\sqrt{2}$

10) $\sqrt{512x^2}$

$16|x|\sqrt{2}$

11) $\sqrt[4]{405x^3y^2}$

$3\sqrt[4]{5x^3y^2}$

12) $\sqrt[3]{-16a^3b^8}$

$-2ab^2\sqrt[3]{2b^2}$

13) $\sqrt[4]{128x^7y^7}$

$2|x| \cdot |y|\sqrt[4]{8x^3y^3}$

14) $\sqrt[3]{16xy}$

$2\sqrt[3]{2xy}$

15) $\sqrt[6]{448x^7y^7}$

$2|x| \cdot |y|\sqrt[6]{7xy}$

16) $\sqrt[3]{56x^5y}$

$2x\sqrt[3]{7x^2y}$

Critical thinking questions:

17) What simplifies into $2mn^2\sqrt[3]{5mn^2}$?

$\sqrt[3]{40m^4n^8}$

18) Simplify $\sqrt[n]{3 \cdot 2^n \cdot x^{2n}y^{n+3}}$

$2x^2y\sqrt[n]{3y^3}$

Adding, Subtracting, Multiplying Radicals

Date_____ Period____

Simplify.

1) $-5\sqrt{3} - 3\sqrt{3}$

$-8\sqrt{3}$

2) $2\sqrt{8} - \sqrt{8}$

$2\sqrt{2}$

3) $-4\sqrt{6} - \sqrt{6}$

$-5\sqrt{6}$

4) $-3\sqrt{5} + 2\sqrt{5}$

$-\sqrt{5}$

5) $-3\sqrt{27} - 3\sqrt{27} - 3\sqrt{27}$

$-27\sqrt{3}$

6) $-3\sqrt{12} + 3\sqrt{3} + 3\sqrt{20}$

$-3\sqrt{3} + 6\sqrt{5}$

7) $-2\sqrt{45} - 3\sqrt{20} - 2\sqrt{6}$

$-12\sqrt{5} - 2\sqrt{6}$

8) $-3\sqrt[6]{3} - 2\sqrt[6]{192} - \sqrt[6]{320}$

$-7\sqrt[6]{3} - 2\sqrt[6]{5}$

9) $-3\sqrt[3]{-3} + 2\sqrt[3]{162} + 3\sqrt[3]{81}$

$12\sqrt[3]{3} + 6\sqrt[3]{6}$

10) $4\sqrt[6]{3} + 2\sqrt[4]{32} - 3\sqrt[6]{192} - 2\sqrt[6]{192}$

$-6\sqrt[6]{3} + 4\sqrt[4]{2}$

11) $-\sqrt[3]{320} - 4\sqrt[3]{5} + 2\sqrt[3]{135} + 2\sqrt[3]{16}$

$-2\sqrt[3]{5} + 4\sqrt[3]{2}$

12) $2\sqrt[3]{6} - \sqrt[6]{6} + 3\sqrt[3]{6} - 3\sqrt[6]{384}$

$5\sqrt[3]{6} - 7\sqrt[6]{6}$

13) $\sqrt[3]{3} \cdot \sqrt[3]{-20}$

$-\sqrt[3]{60}$

14) $\sqrt{5} \cdot \sqrt{3}$

$\sqrt{15}$

15) $\sqrt{6} \cdot \sqrt{2}$

$2\sqrt{3}$

16) $\sqrt[3]{3} \cdot \sqrt[3]{9}$

3

17) $3\sqrt{3}(4 - 3\sqrt{5})$

$12\sqrt{3} - 9\sqrt{15}$

18) $4\sqrt{15}(-3\sqrt{6} + 5)$

$-36\sqrt{10} + 20\sqrt{15}$

19) $4\sqrt{15}(\sqrt{6} + \sqrt{5})$

$12\sqrt{10} + 20\sqrt{3}$

20) $-\sqrt{2}(\sqrt{10} - 4\sqrt{6})$

$-2\sqrt{5} + 8\sqrt{3}$

21) $\sqrt{15}(2\sqrt{10} - 4\sqrt{6})$

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

22) $(-7 + \sqrt{3x})(4 + \sqrt{3x})$

$-28 - 3\sqrt{3x} + 3x$

23) $(\sqrt{2a} - 5)(7\sqrt{2a} - 5)$

$14a - 40\sqrt{2a} + 25$

24) $(2 + \sqrt{5})(-2 + \sqrt{5k})$

$-4 + 2\sqrt{5k} - 2\sqrt{5} + 5\sqrt{k}$

25) $(\sqrt{3} + \sqrt{5x})(\sqrt{3} - 5\sqrt{5x})$

$3 - 4\sqrt{15x} - 25x$

26) $(7 + \sqrt{6})(1 + \sqrt{6})$

$13 + 8\sqrt{6}$

Name_____

Dividing Radicals

Period____

Simplify.

1) $\frac{\sqrt{9}}{\sqrt{25}}$

$\frac{3}{5}$

2) $\frac{\sqrt{4}}{\sqrt{36}}$

$\frac{1}{3}$

3) $\frac{\sqrt{15}}{\sqrt{12}}$

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

4) $\frac{\sqrt{4}}{2\sqrt{20}}$

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

5) $\frac{\sqrt{4}}{4\sqrt{5}}$

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

6) $\frac{4\sqrt{2}}{3\sqrt{5}}$

$\frac{4\sqrt{10}}{15}$

7) $\frac{-3-\sqrt{2}}{3\sqrt{17}}$

$\frac{-3\sqrt{17}-\sqrt{34}}{51}$

8) $\frac{\sqrt{3}+3\sqrt{5}}{2\sqrt{8}}$

$\frac{\sqrt{6}+3\sqrt{10}}{8}$

9) $\frac{\sqrt{3}}{-1-\sqrt{5}}$

$\frac{\sqrt{3}-\sqrt{15}}{4}$

10) $\frac{\sqrt{5}}{5+\sqrt{2}}$

$\frac{5\sqrt{5}-\sqrt{10}}{23}$

11) $\frac{2-\sqrt{3}}{-2-\sqrt{5}}$

$4-2\sqrt{5}-2\sqrt{3}+\sqrt{15}$

12) $\frac{-4+\sqrt{3}}{-1-2\sqrt{5}}$

$\frac{-4+8\sqrt{5}+\sqrt{3}-2\sqrt{15}}{19}$

13) $\dfrac{4+3\sqrt{2}}{-3-\sqrt{5}}$

$\dfrac{-12+4\sqrt{5}-9\sqrt{2}+3\sqrt{10}}{4}$

14) $\dfrac{3}{-4k^2-5\sqrt{k^4}}$

$-\dfrac{1}{3k^2}$

15) $\dfrac{2}{3-\sqrt{3x^2}}$

$\dfrac{6+2x\sqrt{3}}{9-3x^2}$

16) $\dfrac{3}{\sqrt{5x}-3}$

$\dfrac{3\sqrt{5x}+9}{5x-9}$

17) $\dfrac{\sqrt[5]{12}}{4\sqrt[5]{-4}}$

$-\dfrac{\sqrt[5]{3}}{4}$

18) $\dfrac{\sqrt[3]{10}}{\sqrt[3]{625}}$

$\dfrac{\sqrt[3]{2}}{5}$

19) $\dfrac{\sqrt[5]{2}}{3\sqrt[5]{162}}$

$\dfrac{\sqrt[5]{3}}{9}$

20) $\dfrac{3\sqrt[4]{4}}{2\sqrt[4]{8}}$

$\dfrac{3\sqrt[4]{8}}{4}$

21) $\dfrac{\sqrt[4]{5}}{4\sqrt[4]{27}}$

$\dfrac{\sqrt[4]{15}}{12}$

22) $\dfrac{\sqrt[3]{10}}{\sqrt[3]{32}}$

$\dfrac{\sqrt[3]{20}}{4}$

23) $\dfrac{-5+5\sqrt[4]{5}}{3\sqrt[4]{6}}$

$\dfrac{-5\sqrt[4]{216}+5\sqrt[4]{1080}}{18}$

24) $\dfrac{3+\sqrt[3]{3}}{\sqrt[3]{9}}$

$\dfrac{3\sqrt[3]{3}+\sqrt[3]{9}}{3}$

25) $\dfrac{-2x+\sqrt[3]{-5x^4y^3}}{3\sqrt[3]{15x^3y}}$

$\dfrac{-2\sqrt[3]{225y^2}-5y\sqrt[3]{9y^2x}}{45y}$

26) $\dfrac{3-\sqrt[4]{5k^2}}{\sqrt[4]{3k^3}}$

$\dfrac{3\sqrt[4]{27k}-\sqrt[4]{135k^3}}{3k}$