Name Key Date _____ Pd ___

## Radicals and Rational Exponents: 5.1 – 5.2 CYU

☑ Use when you get it right all by yourself

S Use when you did it all by yourself, but made a silly mistake

H Use when you could do it alone with a little help from teacher or peer

G Use when you completed the problem in a group

X Use when a question was attempted but wrong (get help)

N Use when a question was not even attempted

| CONCEPTS | BASIC | INTERMEDIATE | ADVANCED |
|---|---|---|---|
| Simplifying radicals | 1 – 4, 14, 15, 22 - 27 | 11, 16, 17 | 12, 13, 30, 31 |
| Simplifying rational exponents | 28, 29 | 5 - 8 | 32 - 34 |
| Adding & Subtracting Radicals | 9, 10 | 11 | 12, 13 |
| Dividing Radicals | 14, 15 | 16, 17 | |
| Rationalizing the denominator | 16, 17 | 18 - 19 | 20, 21 |
| Multiplying by the conjugate | | 18, 19, 20, 21 | |

**Radicals.** Simplify.

1) $\sqrt[3]{-162}$ $-3\sqrt[3]{6} \approx -5.451$

2) $\sqrt[3]{24m^3}$ $2m\sqrt[3]{3}$

3) $\sqrt[3]{-16a^3b^8}$ $-2ab^2\sqrt[3]{2b^2}$

4) $\sqrt[6]{448x^7y^7}$ $2xy\sqrt[6]{7xy}$

**Rational Exponents.** Simplify.

5) $(64m^4)^{\frac{3}{2}}$ $512m^6$

6) $(81x^{12})^{1.25}$ $243x^{15}$

7) $(216r^9)^{\frac{1}{3}}$ $6r^3$

8) $\left(a^{\frac{1}{2}}\right)^{\frac{3}{2}}$ $a^{\frac{3}{4}}$

**Adding & Subtracting Radicals.** Simplify.

9) $-5\sqrt{3} - 3\sqrt{3}$ $-8\sqrt{3}$

10) $2\sqrt{8} - \sqrt{8}$ $1\sqrt{8}$

11) $-3\sqrt{12} + 3\sqrt{3} + 3\sqrt{20}$ $-3\sqrt{3} + 6\sqrt{5}$

12) $4\sqrt[6]{3} + 2\sqrt[4]{32} - 3\sqrt[6]{192} - 2\sqrt[6]{192}$ $4\sqrt[4]{2} - 6\sqrt[6]{3}$

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

**Dividing Radicals.** Simplify.

14) $\frac{\sqrt{9}}{\sqrt{25}}$ $\frac{3}{5}$

15) $\frac{\sqrt{4}}{\sqrt{36}}$ $\frac{1}{3}$

16) $\frac{\sqrt{4}}{4\sqrt{5}}$ $\frac{\sqrt{5}}{10}$

17) $\frac{4\sqrt{2}}{3\sqrt{5}}$ $\frac{4\sqrt{10}}{15}$

**Rationalizing the Denominator.** Simplify.

18) $\frac{\sqrt{3}}{-1-\sqrt{5}}$ $\frac{\sqrt{15}-\sqrt{3}}{-4}$

19) $\frac{\sqrt{5}}{5+\sqrt{2}}$ $\frac{5\sqrt{5}-\sqrt{10}}{23}$

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

21) $\frac{-4+\sqrt{3}}{-1-2\sqrt{5}}$ $\frac{4-8\sqrt{5}-\sqrt{3}+2\sqrt{15}}{-19}$

**Radical and Rational Expressions.** Rewrite in the opposite form.

22) $7^{\frac{1}{2}}$ $\sqrt{7}$

23) $4^{\frac{4}{3}}$ $\left(\sqrt[3]{4}\right)^4$

24) $2^{\frac{1}{6}}$ $\sqrt[6]{2}$

25) $\left(\sqrt{10}\right)^3$ $10^{\frac{3}{2}}$

26) $\left(\sqrt[4]{5}\right)^5$ $5^{\frac{5}{4}}$

27) $\sqrt[6]{10}$ $10^{\frac{1}{6}}$

28) $(5x)^{-\frac{1}{2}}$ $\frac{1}{\sqrt{5x}}$

29) $(10n)^{\frac{3}{2}}$ $\left(\sqrt{10n}\right)^3$

30) $\left(\sqrt[3]{6x}\right)^4$ $(6x)^{\frac{4}{3}}$

31) $\frac{1}{(\sqrt{3k})^5}$ $(3k)^{-\frac{5}{2}}$

Simplify Completely. No decimals and no negative exponents.

32) $9^{\frac{1}{2}}$ $3$

33) $(9n^4)^{\frac{1}{2}}$ $3n^2$

34) $(x^6)^{\frac{1}{2}}$ $x^3$

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**CYU Reflection:** *How far can you go: basic, intermediate, or advanced?*

**Rate your mastery level!**

How confident are you with the skills this CYU covered? Circle the score you would give yourself.