

Learning Activity – Section 3.1 & 4.5 – Radicals & Rational Exponents

Names: Students _____

Simplify, if possible. If not possible, conclude with an appropriate statement.

1. $-\sqrt{49} = -7$

2. $\sqrt[3]{64} = \sqrt[3]{4^3} = 4.$

3. $\sqrt[3]{-8}$

$\sqrt[3]{(-2)^3} = -2.$

4. $\sqrt{-36}$

$\sqrt{-36} = \text{not real number}$
 sln.

5. $\sqrt[4]{16}$

$\sqrt[4]{2^4} = 2$

6. $\sqrt[5]{100,000}$

$\sqrt[5]{10^5} = 10$

7. $\sqrt{80}$

$\sqrt{16 \cdot 5} = 4\sqrt{5}$

8. $\sqrt[3]{81}$

$81 = 27(3)$

$\sqrt[3]{27 \cdot 3}$
 $= \sqrt[3]{3^3 \cdot 3} = 3\sqrt[3]{3}$

9. $\sqrt[4]{16}$

$\sqrt[4]{2^4} = 2$

10. $\sqrt{54}$

$9 \cdot 6 = 54$

$\sqrt{9 \cdot 6} = \underline{\underline{3\sqrt{6}}}$

$$11. \sqrt{162}, 162 = 81 \cdot 2$$

$$\sqrt{81 \cdot 2} = 9\sqrt{2}$$

$$12. \sqrt[3]{7,000}$$

$$\sqrt[3]{7 \cdot 10^3} = \underline{\underline{10\sqrt[3]{7}}}$$

Write each expression in radical notation and then simplify, if possible. If not possible, conclude with an appropriate statement.

$$13. -36^{1/2}$$

$$-\sqrt{36} = -6$$

$$\text{or } -36^{1/2} = -\left(6^2\right)^{1/2} = \underline{\underline{-6}}$$

$$14. (-64)^{1/3} = \sqrt[3]{-64} = \sqrt[3]{(-4)^3}$$

$$\text{or } \left[(-4)^3\right]^{1/3} = \underline{\underline{-4}}$$

$$15. 16^{-3/2}$$

$$\frac{1}{16^{3/2}} = \frac{1}{\sqrt{16^3}} = \frac{1}{(\sqrt{16})^3} \\ = \frac{1}{4^3} = \frac{1}{64}$$

$$16. -125^{2/3}$$

$$\left. \begin{aligned} -\left(\sqrt[3]{125}\right)^2 &= -\left(\sqrt[3]{5^3}\right)^2 = -5^2 = \underline{\underline{-25}} \\ \text{or } -125^{2/3} &= -\left(5^3\right)^{2/3} = -5^2 = \underline{\underline{-25}} \end{aligned} \right\}$$

$$17. (-144)^{3/2}$$

$$\left(\sqrt{-144}\right)^3$$

↗
not a real number.

$$18. 27^{-4/3}$$

$$\left. \begin{aligned} 27^{-4/3} &= \frac{1}{27^{4/3}} = \frac{1}{\left(\sqrt[3]{27}\right)^4} \\ &= \frac{1}{3^4} = \frac{1}{81} \end{aligned} \right\}$$

$$\text{or } \frac{1}{27^{4/3}} = \frac{1}{\left(3^3\right)^{4/3}} \\ = \frac{1}{3^4} = \frac{1}{81}$$