

**Are there any Homework Questions you would like to see on the board?**

pp. 407-409 # 1 – 9, 11, 12

## Today's Learning Goal(s):

By the end of the class, I will be able to:

- a) Determine the meaning of a power with a rational exponent.
- b) Evaluate rational exponents.

$$9^{\frac{1}{2}} \times 9^{\frac{1}{2}} \rightarrow \therefore 9^{\frac{1}{2}} = 3$$

$$= 9^{\frac{1}{2} + \frac{1}{2}}$$

$$= 9^1$$

$$25^{\frac{1}{2}} \cdot 25^{\frac{1}{2}} \downarrow$$
$$= 25^{\frac{1}{2} + \frac{1}{2}} \quad 25^{\frac{1}{2}} = 5$$
$$= 25$$

MCF 3MI

## 7.4 Working with Rational Exponents

Date: May 15/18

Rational Exponent RULES:

$$a^{\frac{1}{n}} = \sqrt[n]{a}$$

$$a^{\frac{m}{n}} = \left(\sqrt[n]{a}\right)^m$$

$$a^{\frac{m}{n}} = \left(a^{\frac{1}{n}}\right)^m$$

Ex. 1: Evaluate each of the following without a calculator

a)  $25^{\frac{1}{2}}$       b)  $27^{\frac{1}{3}}$       c)  $27^{\frac{2}{3}}$       d)  $(-27)^{\frac{2}{3}}$       e)  $(-27)^{-\frac{2}{3}}$

$$= \sqrt{25} = 5$$

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

$$= (27^{\frac{1}{3}})^2 = (\sqrt[3]{27})^2 = 3^2 = 9$$

$$= (\sqrt[3]{-27})^2 = (-3)^2 = 9$$

$$= \left(\frac{1}{-27}\right)^{\frac{2}{3}} = \left(\sqrt[3]{\frac{1}{-27}}\right)^2 = \left(\frac{\sqrt[3]{1}}{\sqrt[3]{-27}}\right)^2 = \left(\frac{1}{-3}\right)^2 = \frac{1}{9}$$

*Handwritten note for c):*  $(27^{\frac{1}{3}})^2 = 3^2 = 9$   
 $(27^{\frac{2}{3}})^{\frac{1}{3}} = 729^{\frac{1}{3}} = \sqrt[3]{729} = 9$

f)  $32^{0.2}$       g)  $256^{0.25}$       h)  $81^{-0.25}$       i)  $-(49)^{0.5}$       j)  $\left(\frac{1}{8^6}\right)^{\frac{1}{8^3}}$

$$= 32^{\frac{2}{10}} = 32^{\frac{1}{5}} = \sqrt[5]{32} = 2$$

$$= 256^{\frac{25}{100}} = 256^{\frac{1}{4}} = \sqrt[4]{256} = 4$$

$$= 81^{-\frac{1}{4}} = \left(\frac{1}{81}\right)^{\frac{1}{4}} = \frac{1}{\sqrt[4]{81}} = \frac{1}{3}$$

$$= -(49)^{\frac{5}{10}} = -(49)^{\frac{1}{2}} = -(\sqrt{49}) = -7$$

$$= \frac{\left(\frac{1}{8^6}\right)^{\frac{1}{8^3}}}{8^{\frac{1}{2} + \frac{1}{3}}} = \frac{8^{\frac{7}{6}}}{8^{\frac{5}{6}}} = 8^{\frac{7}{6} - \frac{5}{6}} = 8^{\frac{2}{6}} = \sqrt[3]{8} = 2$$

Ex. 2: Write in exponent form. Then evaluate.

a)  $\sqrt[10]{1024}$       b)  $\sqrt[5]{1024}$       c)  $(\sqrt[3]{-216})^5$

$$= 1024^{\frac{1}{10}} = 2$$

$$= 1024^{\frac{1}{5}} = 4$$

$$= (-216)^{\frac{5}{3}} = (-6)^5 = -7776$$

$$= 8^{\frac{7}{6} - \frac{5}{6}} = 8^{\frac{2}{6}} = \sqrt[3]{8} = 2$$

Ex. 3: If time, do one example from each question in the homework (below).

3b) Use your calculator to find  $0.0625^{\frac{1}{4}}$

6e) Write with a single power with a positive exponent  $\left(10^8\right)^{-2}$

7d) Write with a single power with a positive exponent  $4^{0.3} \div 4^{0.8} \times 4^{-0.7}$

**Today's Homework:**

**READ** p. 415 **and** **READ** p. 418

p. 415 # 1, 2cef, 3, 6, 7, 9 – 12, 14, 15

p. 419 # 1 – 8

**SWYK Tomorrow**