

Exponential Functions Review

MCR 3U

Example 1

Simplify:

a) $-9^{\frac{1}{2}}$

b) $25^{\frac{3}{2}}$

c) $(64n^4)^{\frac{1}{2}}$

d) $\frac{\sqrt[4]{81}}{81^{-\frac{1}{4}}}$

e) $\frac{(16a^4b^{-\frac{8}{3}})^{\frac{3}{4}}}{(-2ab^{-3})^2}$

a) $-\sqrt{9} = (\sqrt{25})^3$

$= -3$

$(-9)^{\frac{1}{2}}$

= No soln

$= 5^3$

125

c) $\sqrt{64n^4}$

$= 8n^2$

$= 64n^2$

$= 8n^2$

d) $\frac{8^{\frac{1}{4}}}{8^{-\frac{1}{4}}}$

$= 8^{\frac{1}{4} - (-\frac{1}{4})}$

$= 8^{\frac{1}{2}}$

$= \sqrt{8}$

$= 2\sqrt{2}$

$$e) \frac{(16a^4b^{-\frac{8}{3}})^{\frac{3}{4}}}{(-2ab^{-3})^2}$$

$$= \frac{16^{\frac{3}{4}} a^3 b^{-2}}{4a^2 b^{-6}}$$

$$= \frac{(2\sqrt[4]{16})^3 a^3 b^{-2}}{4a^2 b^{-6}}$$

$$= \frac{8a^3 b^{-2}}{4a^2 b^{-6}}$$

$$= \frac{2ab^4}{1}$$

~~$$= 2a$$~~

Example 2

Mr. Nantais buys a new Tesla worth \$92,000. The car depreciates 20% per year.

- Determine an equation that best models the scenario.
- What is the price of the Tesla after 10 years?
- How long will it take for the price of the Tesla to be worth half of the original price?

$$a) C(t) = 92000(0.8)^t$$

$$b) C(10) = 92000(0.8)^{10}$$

$$= \$9878.42$$

$$c) \frac{46000}{92000} = \frac{92000(0.8)^t}{92000}$$

$$0.5 = (0.8)^t$$

$$t = 3$$



Example 3

The half-life of uranium is 260 years.

- a) Find how much uranium remains if a 76g sample is left for 100 years.
 b) How long will it take for the isotope to reach 26.16g?

$$a) m(t) = 76 \left(\frac{1}{2} \right)^{\frac{t}{260}}$$

$$m(100) = 76 \left(\frac{1}{2} \right)^{\frac{100}{260}}$$

$$= 58.2 \text{ g}$$

$$b) \frac{26.16}{76} = \frac{76 \left(\frac{1}{2} \right)^{\frac{t}{260}}}{76}$$

$$0.34421 = \left(\frac{1}{2} \right)^{\frac{t}{260}}$$

$$\boxed{t \approx 400 \text{ years}} \quad \therefore \longrightarrow$$

Review Questions

- Page 210, #1,4,6-9
- Page 212-213, #1,2,4-6,11ade,13
- Review “Exponential Functions Investigation” Worksheet
- Review “Exponential Applications” Worksheet (Word Problems)

