## ERL MAP UNIT 6 Algebraic Models Practice

Friday, January 19, 2018 8:06 A



### **Chapter 6 : Algebraic Models**

### **A. Simplifying / Evaluating Exponents**

1. Simplify (Remember: leave no negative exponents in your answer.)

a. 
$$\frac{y^{-1}}{y^{-2}}$$
  
b.  $x^{-1}(x^{-3})^{-2}x^{-7}$   
 $= y^{-1-(-2)}$   
 $= x^{-1}(x^6)x^{-7}$   
 $= x^{-1+6-7}$   
 $= x^{-2}$   
 $= x^{-2}$ 

$$c. \frac{t}{v} \left(\frac{v}{t}\right)^{-3} v^{4}$$

$$= \frac{t}{v} \left(\frac{t}{v}\right)^{3} v^{4}$$

$$= \frac{t}{v} \cdot \frac{t}{v^{3}} \cdot v^{4}$$

$$= \frac{t}{v} \cdot \frac{t}{v^{3}} \cdot v^{4}$$

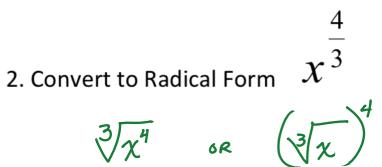
$$= \frac{t}{v} \cdot \frac{t}{v^{4}} \cdot v^{4}$$

$$= t^{4} \cdot v^{0}$$

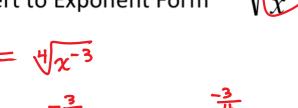
$$= t^{4} \cdot v^{0}$$

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3. Convert to Exponent Form



#### 4. Evaluate

a. 
$$16^{\frac{1}{2}}$$

c. 
$$(-27)^{\frac{1}{3}}$$

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

$$_{\text{b.}}\,16^{\frac{1}{4}}$$

$$d. \left(\frac{1}{9}\right)^{\frac{3}{2}}$$

$$=\frac{1}{(\sqrt{9})^3}$$

$$=\frac{1}{3^3}$$

$$=\frac{1}{27}$$

### **B. Exponential Equations**

5. Solve for the unknown. Express with a common base, if possible. Otherwise use systematic trial.

a. 
$$4^{x} = 8$$

b.  $(81)^{\frac{1}{2}} = (24)^{x+1}$ 
 $2^{2x} = (2^{3})$ 
 $3^{\frac{1}{2}} = (3^{5})^{\frac{1}{2}}$ 
 $3^{\frac{1}{2}} = (3^{\frac{1}{2}})^{\frac{1}{2}}$ 
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# Chapter 6: Algebraic Models - Practice **Problems**

## A. Simplifying and Evaluating Exponents

- 1. Simplify, with no negative exponents:
- a.  $(m^5)(m^2)$  b.  $t^4 \div t$

c. 
$$(x^5)^3$$

c. 
$$(x^5)^3$$
 d.  $(\frac{x}{y})^{-3}$  e.  $-(-x)^0$ 

e. 
$$-(-x)^{0}$$



a. 
$$c^2d^3$$

b. 
$$\frac{c^2d^3}{c^4d}$$

c. 
$$\frac{4c^{1/2}d}{c^{3/2}}$$

c. 
$$\frac{4c^{1/2}d}{c^{3/2}}$$
 d.  $c^{-1}d^2 \times c^3 \div c^2$ 

3. Evaluate, round to nearest 1000<sup>th</sup> if necessary.

a. 
$$64^{\frac{2}{3}}$$

$$b. \left(\frac{36}{121}\right)^{\frac{3}{2}}$$

c. 
$$2.1^{-1.6}$$

4a. Write in radical form:

i. 
$$a^{\frac{1}{3}}$$

ii. 
$$a^{\frac{2}{3}}$$

i. 
$$a^{\frac{1}{3}}$$
 ii.  $a^{\frac{2}{3}}$  iii.  $a^{-\frac{1}{5}}$ 

4b. Write in exponential form:

i. 
$$\sqrt{x}$$

ii. 
$$\sqrt[3]{x^2}$$

i. 
$$\sqrt{x}$$
 ii.  $\sqrt[3]{x^2}$  iii.  $\frac{1}{\sqrt[4]{a}}$ 

### **B.** Exponential Equations

5. Solve the following equations algebraically (using common base). Check your answers.

a. 
$$4^{2x} = 4^6$$
 b.  $5^x = 625$ 

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c. 
$$3^{2x+1} = 9$$

d. 
$$10^{x+1} = 10^{2x-3}$$

e. 
$$4^{3x-2} = 32^{x+1}$$
 f.  $25^{x+1} = 125^{x-2}$ 

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6. Determine the value of y to the nearest tenth, using systematic trial.

a. 
$$10^y = 125$$
 b.  $3^y = 6$ 

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c. 
$$250(1.03)^y = 400$$

## C. Application Problems

- 7. The amount of medicine A(mg) remaining in a body after t hours can be calculated using the formula  $A = 250(0.75)^t$ .
- a. Calculate the amount of medicine in *mg* remaining in a body after 5 hours.

b. How long to the nearest hour will it take until there is 10 mg remaining.

#### Chapter 6: Algebraic Models - Practice Problems

#### A. Simplifying and Evaluating Exponents

1. Simplify, with no negative exponents:

a. 
$$(m^5)(m^2)$$

b. 
$$t^4 \div t$$

c. 
$$(x^5)^3$$

d. 
$$\left(\frac{x}{v}\right)^{-3}$$

a. 
$$(m^5)(m^2)$$
 b.  $t^4 \div t$  c.  $(x^5)^3$  d.  $\left(\frac{x}{v}\right)^{-3}$  e.  $-(-x)^0$ 

2. Evaluate the following when c=5 and d=-3.

a. 
$$c^2d^3$$

b. 
$$\frac{c^2 d^3}{c^4 d}$$

c. 
$$\frac{4c^{1/2}d}{c^{3/2}}$$

$$d. c^{-1}d^2 \times c^3 \div c^2$$

3. Evaluate, round to nearest 1000<sup>th</sup> if necessary.

a. 
$$64^{\frac{2}{3}}$$

b. 
$$\left(\frac{36}{121}\right)^{\frac{3}{2}}$$

c. 
$$2.1^{-1.6}$$

4a. Write in radical form:

$$a^{\frac{1}{3}}$$

i. 
$$a^{\frac{1}{3}}$$
 ii.  $a^{\frac{2}{3}}$  iii.  $a^{-\frac{1}{5}}$ 

4b. Write in exponential form: i.  $\sqrt{x}$  ii.  $\sqrt[3]{x^2}$  iii.  $\frac{1}{\sqrt[4]{a}}$ 

ii. 
$$\sqrt[3]{x^2}$$

iii. 
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<u>B. Exponential Equations</u>5. Solve the following equations algebraically (using common base). Check your answers.

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 e.  $4^{3x-2} = 32^{x+1}$  f.  $25^{x+1} = 125^{x-2}$ 

$$e. 4^{3x-2} = 32^{x+1}$$

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#### C. Application Problems

- 7. The amount of medicine A(mg) remaining in a body after t hours can be calculated using the formula  $A = 250(0.75)^t$ .
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**1a.** 
$$m^7$$
, **b.**  $t^3$ , **c.**  $x^{15}$ , **d.**  $\frac{y^3}{x^3}$ , **e.** -1, **2a.** -675, **b.** 0.36, **c.** -2.4, **d.** 9, **3a.** 16, **b.**  $\frac{216}{1331} = 0.1623$ , **c.** 0.3051

**4a.** i. 
$$\sqrt[3]{a}$$
, ii..  $(\sqrt[3]{a})^2$  iii.  $\frac{1}{\sqrt[5]{a}}$  **4b.** i.  $x^{1/2}$ , ii.  $x^{3/2}$  iii.  $\frac{1}{x^{1/4}}$  **5a.** 3, **b.** 4, **c.** 0.5, **d.** 4, **e.** 9, **f.** 8,

6a. 2.1, b. 1.6, c. 15.9 7a. 59.3 b. 11 hours