Unit 4 Exponential Fxns Review Period

Warm Up

① a) Solve $3(4)^{x-1} = \frac{3}{32}$

$\frac{3}{32} \div \frac{3}{1}$

$\frac{3}{32} \times \frac{1}{3}$

$= \frac{\cancel{3}^{1}}{\cancel{3}(32)}$

$= \frac{1}{32}$

$4^{x-1} = \frac{1}{32}$

$4^{x-1} = 32^{-1}$

$(2^2)^{x-1} = (2^5)^{-1}$

$2^{2x-2} = 2^{-5}$

$\therefore 2x-2 = -5$

$2x = -3$

$x = -\frac{3}{2}$

b) Check

LS

$3(4)^{x-1}$

$= 3(4)^{-\frac{3}{2}-1}$

$= 3(4)^{-\frac{5}{2}}$

$= 3(\sqrt{4})^{-5}$

$= 3(2)^{-5}$

$= 3\,\frac{1}{2^5} = \frac{3}{32}$

RS

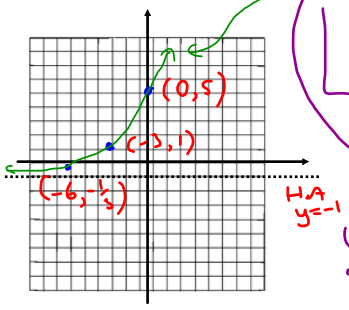
$\frac{3}{32}$

✓

$\therefore LS = RS$

② Sketch $y = 2(3)^{\frac{1}{3}x+1} - 1$

$y = a(b)^{k(x-d)} + c$



$y = 2(3)^{\frac{1}{3}(x+3)} - 1$

KP

$(-1, \frac{1}{3}) \rightarrow (-6, -\frac{1}{3})$

$(0, 1) \rightarrow (-3, 1)$

$(1, 3) \rightarrow (0, 5)$

H.A $y=0 \rightarrow y = -1$ (H.A)

	x	y
R		
S	3	2
T	-3	-1

Unit 4 Review Homework

- p267 #4, 5, 8, 9, 11, 13, 14, 15, 17
- Unit Test on Tuesday, April 28th

$\left(\frac{5}{2}\right)^3 = \frac{125}{8}$

4. Evaluate. Express answers in rational form.

a) $\left(\frac{2}{5}\right)^{-3}$

b) $\left(\frac{16}{225}\right)^{-0.5}$

c) $\frac{(81)^{-0.25}}{\sqrt[3]{-125}}$

d) $(\sqrt[3]{-27})^4$

e) $(\sqrt[5]{-32})(\sqrt[6]{64})^5$

f) $\sqrt[6]{((-2)^3)^2}$

$\left[(-2)^6\right]^{\frac{1}{6}}$

$= \left[2^6\right]^{\frac{1}{6}}$

$= 2^{\frac{6}{6}}$

$= 2^1$

$= 2$

5. Simplify. Write with only positive exponents.

a) $a^{\frac{3}{2}}(a^{-\frac{3}{2}})$

b) $\frac{b^{0.8}}{b^{-0.2}}$

c) $\frac{c\left(c^{\frac{5}{6}}\right)}{c^2}$

d) $\frac{d^{-5}d^{\frac{11}{2}}}{(d^{-3})^2}$

e) $((e^{-2})^{\frac{7}{2}})^{-2}$

f) $((f^{-\frac{1}{6}})^{\frac{6}{5}})^{-1}$

Exponential Fxns Test

- simplify exponential expressions
- evaluate exponential expressions
- solve exponential equations (handout)..know how to 'check'
- determine 'linear, quadtratic, exponential' using table of values
- graph transformations of exponential functions
- write equations of exponential functions given parameters 'a, k, d and c'
- applications

8. Simplify. Write each expression using only positive exponents. All variables are positive.

a) $\sqrt[3]{27x^3y^9}$

b) $\sqrt{\frac{a^6b^5}{a^8b^3}}$

c) $\frac{m^{\frac{3}{2}}n^{-2}}{m^{\frac{7}{2}}n^{-\frac{3}{2}}}$

d) $\frac{\sqrt[4]{x^{-16}(x^6)^{-6}}}{(x^4)^{-\frac{11}{2}}}$

e) $((-x^{0.5})^3)^{-1.2}$

f) $\frac{\sqrt{x^6(y^3)^{-2}}}{(x^3y)^{-2}}$

Lesson 4.5

9. Identify the type of function (linear, quadratic, or exponential) for each table of values.

a)

x	y	
−5	−38	35
0	−3	10, 45
5	42	10, 55
10	97	10, 65
15	162	
20	237	

b)

x	y	
0	−45	30
2	−15	30
4	15	30
6	45	
8	75	
10	105	

x	y		
−2	6		
		4	
−1	10		4
		8	
0	18		8
		16	
1	34		16
2	66	32	

Exponential because ratios of differences is 2

11. For each exponential function, state the base function, $y = b^x$. Then state the transformations that map the base function onto the given function. Use transformations to sketch each graph.

a) $y = \left(\frac{1}{2}\right)^{\frac{x}{2}} - 3$

b) $y = \frac{1}{4}(2)^{-x} + 1$

c) $y = -2(3)^{2x+4}$

	Function	Exponential Growth or Decay?	Initial Value (*y*-intercept)	Growth or Decay Rate
a)	$V(t) = 100(1.08)^t$			
b)	$P(n) = 32(0.95)^n$			
c)	$A(x) = 5(3)^x$			
d)	$Q(n) = 600\left(\frac{5}{8}\right)^n$			

14. A hot cup of coffee cools according to the equation

$$T(t) = 69\left(\frac{1}{2}\right)^{\frac{t}{30}} + 21$$

where T is the temperature in degrees Celsius and t is the time in minutes.

a) Which part of the equation indicates that this is an example of exponential decay?

b) What was the initial temperature of the coffee?

c) Use your knowledge of transformations to sketch the graph of this function.

d) Determine the temperature of the coffee, to the nearest degree, after 48 min.

e) Explain how the equation would change if the coffee cooled faster.

f) Explain how the graph would change if the

17. The population of a city is growing at an average rate of 3% per year. In 1990, the population was 45 000.

a) Write an equation that models the growth of the city. Explain what each part of the equation represents.

b) Use your equation to determine the population of the city in 2007.

c) Determine the year during which the population will have doubled.

d) Suppose the population took only 10 years to double. What growth rate would be required for this to have happened?

c) What is the car's value at the end of 3 years?

d) What is its value at the end of 30 months?

e) How much value does the car lose in its first year?

f) How much value does it lose in its fifth year?