

Name _____

Date _____

Advanced Algebra

Unit 3: Exponential, log and Power functions

Review for Unit 3 test:**Learning Target #2: I know my exponential properties. (These are found on page 246 in your book)**

Simplify the following expressions:

a) $(y^4)^3$	b) $x^4 * x^{-2}$	c) $3y^2 * y^2$	d) $(x^{-3})^5$
e) $(x^3 y^4)^4$	f) $(2xy^3)^{-2}$	g) $(-3x^2)^2$	h) $4x^{-1}y$
i) $3x^0 y^4$	j) $\frac{x^3}{x^{-1}}$	k) $\frac{-12xy}{7x^4} * \frac{21x^5 y^2}{4y}$	j) $\frac{xy^9}{3y^{-2}} * \frac{-7y}{21x^5}$

Learning Target #3: I can solve power functions. You should also be able to recognize what makes a power function. Key point: The variable is the base.

- 1) $x^7 = 4000$
- 2) $x^{0.5} = 28$
- 3) $x^{-3} = 247$
- 4) $5x^{\frac{1}{4}} + 6 = 10.2$
- 5) $3x^{-2} = 2x^4$
- 6) $-3x^{\frac{1}{2}} + (4x)^{\frac{1}{2}} = -1$

Learning Target #4: I can solve exponential equations with the change of base method. This was our first method to solve exponential equations. We did this by making a chart of bases and exponents and getting both sides of the equation to have the same base.

This is an example of a exponent chart:

	Exponent			
Base	1	2	3	4
2	2	4	8	16
3	3	9	27	81
4	4	16	64	256

Solve the following exponential equations by getting the base on both sides to be the same.

7) $3^x = \frac{1}{9}$	8) $4^3 = 16^{\frac{1}{2}}$	9) $25^2 = 125^3$
10) $36^3 = 6^{2x}$	11) $64^{3x} = 4^{-2}$	12) $(\frac{5}{3})^x = \frac{27}{125}$
13) $(\frac{1}{3})^x = 243$	14) $5(3^x) = 5$	15) $32^{3x} = 4$

Learning Target #5 and #6: I can rewrite expressions with rational and radical notation

Rewrite the expression using rational exponents:

a) $\sqrt[5]{12}$

b) $\sqrt[3]{9}$

c) $\sqrt[5]{x^2}$

Rewrite the rational exponents using radical notation

a) $x^{\frac{2}{3}}$

b) $(x^{\frac{1}{3}})^3$

c) $(x^{\frac{1}{9}})^6$

More practice involving radical and rational notation:

17) $\sqrt[4]{x}$

18) $\sqrt[2]{x}$

19) $\sqrt{x^4}$

20) $\sqrt[4]{x^6}$

21) $\sqrt[3]{x^8}$

22) $x^{\frac{2}{3}}$

23) $x^{6/7}$

24) $\sqrt[5]{12}$

25) b) $\sqrt[3]{9}$

26) $\sqrt[5]{x^2}$

Learning Target #7: I can define a log function: Key point. I log is the inverse operation of an exponential function. It is important to understand inverse.

Learning Target #8: I can work with exponential and log functions:

Write the equations in exponential form

1) $\log_3 27 = 3$

2) $\log_4 256 = 4$

3) $\log_6 36 = 2$

4) $\log_6 216 = 3$

5) $\log_2 32 = 5$

6) $\log_8 64 = 2$

7) $\log_7 343 = 3$

8) $\log_3 6561 = 8$

9) $\log_2 4 = 2$

10) $\log_9 \left(\frac{1}{81}\right) = -2$

Write each equation in logarithmic form

7) $3^5 = 243$

8) $10^{.12} = 1.318$

9) $4^{-1} = \frac{1}{4}$

10) $16^{-1/2} = \frac{1}{4}$

11) $4^3 = 64$

12) $13^2 = 169$

Learning Target #9: I know my Log Rules

I NEED TO STUDY MY LOG RULES TONIGHT. The Log RULES ARE

1) $\log_a(uv) = \log_a u + \log_a v$ Product Property

2) $\log_a \frac{u}{v} = \log_a u - \log_a v$ Quotient Property

3) $\log_a u^n = n \log_a u$ Power property

I can use log rules to write expressions as a single logarithm

13) $\log_3 16 - (\log_3 2 + \log_3 4)$

14) $\log_5 18 - (\log_5 3 + \log_5 4)$

15) $\log_6 4 + \log_6 8$

16) $\log_6 12 - \log_6 14$

17) $\log_9 3 + \log_9 4 - \log_9 6$

Learning Target #10: I can solve equations involving Logarithms.

Solve the following for x:

1) $\log_7 8 + 9 \log_7 x = \log_7 2$

2) $\log_6(x+3) - \log_6(x-4) = \log_6 8$

Learning Target #14: I can find the Inverse of a function. Switch your x and y then solve for y

1) What is the inverse of the equation $y = 2x + 3$

Learning Target #15. I can write the equation of a curve in the form $y = U_0 \cdot r^x$

- 1) Write the equation of the curve in the form $y = a \cdot b^x$ given the 2 points on the curve (3,54)(5,486)

Make the table fill it in and then go backwards!!

Term	0	1	2	3	4	5
Value						

- 2) Find the equation of an exponential curve through the points (3,5) and (7,32)

Learning Target: I can model real world situations with exponential functions.

1) You purchased a new car for \$20,000. The value of the car decreases by 16% each year.

a) What is the equation for the situation?

b) What is the value after 5 years?

2) You deposit \$4,000 in the bank. It earns 4% interest compounded monthly.

a) What is the equation for the situation?

b) What is the value after 5 years?

3) You deposit \$3,000 in the bank. It earns 4% compounded quarterly.

a) What is the equation for the situation?

b) What is the value after 5 years?

4) Ronin bought a new car for \$17,500. The value of the car is depreciating at a rate of 16% each year.

a) What is the equation for the situation?

b) What is the value of the car after 3 years?

Learning Target: I know my exponential properties. (These are found on page 246 in your book)

More Practice on Solving Equations

a) $27 = (1/9)^x$

b) $8x^5 = 1312$

c) $4x^{\frac{2}{3}} - 5 = 11$

d) $2^x = 128$

e) $3^x = 16$

f) $5^x = 18$

g) $8^x = 75$

h) $9^x = 6012$

i) $12^x = 720$

j) $16^x = 1800$

k) $-2 = \log_x \left(\frac{1}{36} \right)$

l) $\sqrt[5]{x} = 12$

m) $\sqrt[5]{x^3} = 27$

n) $\frac{1}{\sqrt{x}} = .77$

n) $4\sqrt[3]{x+18} = 32$