Name: Key 2018-2019 Period: _____ Date: _____ ID: A

Algebra 1 Study Guide 6.1 - 6.3

Evaluate the expression. Be sure to rewrite any fractional exponents in radical form first.

1. $6.4^0 = 1$

2. $3^{-2} = \frac{1}{3^2} = \frac{1}{9}$

3. $81^{\frac{1}{4}} = \sqrt[4]{81} = 3$

Evaluate the expression. Be sure to rewrite any expression that is in exponent form, in radical form first.

4. $\left(\frac{1}{64}\right)^{1/3} = \sqrt[3]{\frac{1}{64}} = \frac{1}{4}$

5. $1000^{2/3} = \left(\sqrt[3]{1000}\right)^2 = (10)^2 = 100$

6. $\left(\sqrt{36}\right)^3 = (6)^3 = 216$

7. $(8)^{-2/3} = \frac{1}{8^{\frac{2}{3}}} = \frac{1}{\left(\sqrt[3]{8}\right)^2} = \frac{1}{2^2} = \frac{1}{4}$

Simplify the expression. Write your answer using only positive exponents. You must show work for this!

8. $\left(\frac{3d^2}{4}\right)^{-5} = \frac{3^{-5}d^{-10}}{4^{-5}} = \frac{4^5}{3^5 d^{10}} = \frac{1024}{243d^{10}}$

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9. $(4d^8)^{-5} = 4^{-5}d^{-40} = \frac{1}{4^5 d^{40}} = \frac{1}{1024d^{40}}$

10. $-7r^{-9}s^0 = \frac{7 \cdot 1}{r^9} = \frac{7}{r^9}$

11. $\frac{3^0 x^{-7} z^0}{4^2 y^{-3}} = \frac{1 \cdot 1 \cdot y^3}{x^7 \cdot 4^2} = \frac{y^3}{16x^7}$

12. $(x^6)^3 = x^{18}$

Simplify the expression. Write your answer using only positive exponents.

13. $\left(\frac{2x^{-4}}{12x^{-3}y^0}\right)^3 = \left(\frac{2}{12} \cdot \frac{x^3}{x^4} \cdot \frac{1}{y^0}\right)^3 = \left(\frac{1}{6} \cdot \frac{1}{x^1} \cdot \frac{1}{1}\right)^3$

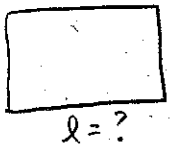
$= \left(\frac{1}{6x}\right)^3 = \frac{1}{6^3x^3} = \frac{1}{216x^3}$

Find the indicated real *n*th root(s) of *a*.

14. $n = 4, a = 81$ $\sqrt[4]{81} = 3$

15. $n = 4, a = -625$ $\sqrt[4]{-625}$ = no real solution

16. The area of a rectangular yard with a width of $7a^3b$ feet is $9a^2b^5$ square feet. What is the length?



$A = lw$ $A = 9a^2b^5$

$9a^2b^5 = l \cdot (7a^3b)$

$\frac{9a^2b^5}{7a^3b} = l$

$\frac{9b^4}{7a^1} = l$

The length is $\frac{9b^4}{7a}$ feet.

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17. A galaxy is 10^5 light-years away from Earth. Another galaxy is 10^7 times farther away from Earth than the first galaxy. How far away (in light-years) is the second galaxy? Write your answer in scientific notation and in standard form.

$10^5 \cdot 10^7 = 10^{12}$

scientific 1×10^{12}

standard 1,000,000,000,000

The second galaxy is 1×10^{12} light years away from Earth.

Determine whether the table represents a *linear* or an *exponential* function. Explain and be sure to show proof of your conclusion.

18. x's ↑ by 1

x	y
0	2
1	4
2	6
3	8

$y_2 - y_1$

$8 - 6 = 2$
$6 - 4 = 2$
$4 - 2 = 2$
} constant difference

↙ would be "m" slope

The table represents a linear function because the difference of consecutive y's is constant.

19. x's ↑ by 1

x	y
1	5
2	10
3	20
4	40

$y_2 - y_1$

$10 - 5 = 5$
$20 - 10 = 10$

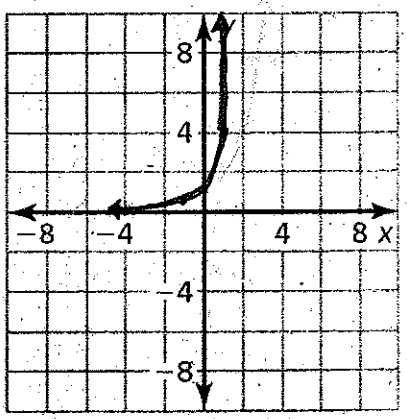
Not constant, not linear

$\frac{y_2}{y}$:

$\frac{40}{20} = 2$
$\frac{20}{10} = 2$
$\frac{10}{5} = 2$
} The table represents an exponential function because the ratio of consecutive y's is constant.

base = 2

20. Graph $y = 4^x$. Be sure to show an x and y table. Describe the domain and range.



$y = 4^x$

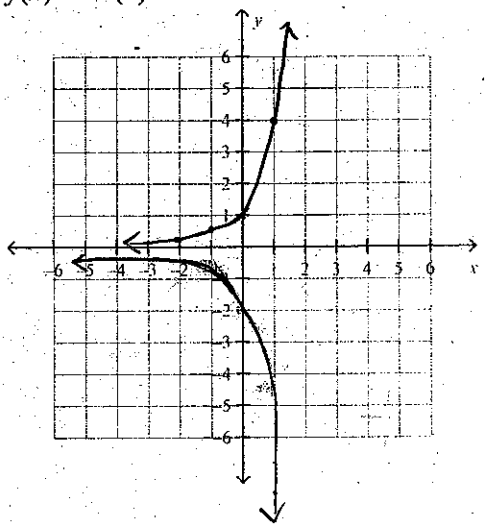
x	y
−1	$\frac{1}{4}$
0	1
1	4
2	16

D: $\mathbb{R}$ (the set of all real numbers)

R: $\{y > 0\}$

Graph the function. Compare the function to the graph of the parent function. Describe the domain and range of *f*.

21. $f(x) = -2(4)^x$



parent

$y = 4^x$

x	y
−1	$\frac{1}{4}$
0	1
1	4

$f(x) = -2(4)^x$

x	f(x)
−1	$-\frac{1}{2}$
0	−2
1	−8

D: $\mathbb{R}$

R: $\{y < 0\}$

$f(x) = -2(4)^x$ is a reflection over the x-axis and a vertical stretch by a factor of 2 of $y = 4^x$.