Exponents Homework – Sample Test: Exponents*

Kenny M. Felder

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Abstract

This module provides a sample test over exponents.

Simplify. Your answer should not contain any negative or fractional exponents.

Exercise 1
x^{-6}

Exercise 2
x^{0}

Exercise 3
$x^{\frac{1}{8}}$

Exercise 4
$x^{\frac{2}{3}}$

Exercise 5
$\frac{1}{a^{-3}}$

Exercise 6
$\left(\frac{2}{3}\right)^{2}$

Exercise 7
$\left(\frac{1}{2}\right)^{-x}$

Exercise 8
$(-2)^{2}$

Exercise 9
$(-2)^{3}$

Exercise 10
$(-2)^{-1}$

Exercise 11
$(-9)^{\frac{1}{2}}$

Exercise 12
$(-8)^{\frac{1}{2}}$

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Exercise 13
$y^{\frac{1}{4}}y^{\frac{3}{4}}$

Exercise 14
$\frac{4x^4y^5z}{6\text{wxy}^{-3}z^3}$

Exercise 15
$\left(x^{\frac{1}{2}}\right)^3$

Exercise 16
$\left(x^{\frac{1}{2}}\right)^2$

Exercise 17
$x^{\frac{6}{3}}$

Exercise 18
$x^{\frac{-3}{4}}$

Exercise 19
$(4 \times 9)^{\frac{1}{2}}$

Exercise 20
$4^{\frac{1}{2}}9^{\frac{1}{2}}$

Exercise 21
Give an algebraic formula that gives the generalization for #18-19.

Solve for x:

Exercise 22
$8^x = 64$

Exercise 23
$8^x = 8$

Exercise 24
$8^x = 1$

Exercise 25
$8^x = 2$

Exercise 26
$8^x = \frac{1}{8}$

Exercise 27
$8^x = \frac{1}{64}$

Exercise 28
$8^x = \frac{1}{2}$

Exercise 29
$8^x = 0$

Exercise 30
Rewrite $\frac{1}{\sqrt[3]{x^2}}$ as xsomething.

Solve for x:

Exercise 31
$2^{x+3}2^{x+4} = 2$

Exercise 32
$3^{\left(x^2\right)} = \left(\frac{1}{9}\right)^{3x}$

Exercise 33
A friend of yours is arguing that x1/3 should be defined to mean something to do with "fractions, or division, or something." You say "No, it means _____ instead." He says "That's a crazy definition!" Give him a convincing argument **why** it should mean what you said it means.

Exercise 34
On October 1, I place 3 sheets of paper on the ground. Each day thereafter, I count the number of sheets on the ground, and add that many again. (So if there are 5 sheets, I add 5 more.) After I add my last pile on Halloween (October 31), how many sheets are there total?

a. Give me the answer as a formula.
b. Plug that formula into your calculator to get a number.
c. If one sheet of paper is $\frac{1}{250}$ inches thick, how thick is the final pile?

Exercise 35
Depreciation
The Web site www.bankrate.com defines **depreciation** as "the decline in a car's value over the course of its useful life" (and also as "something new-car buyers dread"). The site goes on to say:
Let's start with some basics. Here's a standard rule of thumb about used cars. A car loses 15 percent to 20 percent of its value each year.

For the purposes of this problem, let's suppose you buy a new car for exactly $10,000, and it loses only 15% of its value every year.

a. How much is your car worth after the first year?
b. How much is your car worth after the second year?
c. How much is your car worth after the nth year?
d. How much is your car worth after ten years? (This helps you understand why new-car buyers dread depreciation.)

Exercise 36
Draw a graph of $y = 2 \times 3^x$. Make sure to include negative and positive values of x.

Exercise 37
Draw a graph of $y = \left(\frac{1}{3}\right)^x - 3$. Make sure to include negative and positive values of x.

Exercise 38
What are the **domain** and **range** of the function you graphed in number 36?

Extra Credit:
We know that $(a+b)^2$ is not, in general, the same as $a^2 + b^2$. But under what circumstances, if any, **are** they the same?