Discovering Exponents Key

Write the answers to each of the exercises in the space provided. Your answer must be in the form of either a whole number or a fraction (NO DECIMALS). You are NOT allowed to use a calculator. Simply follow the pattern.

a) $2^5 = _32__$

$2^4 = _16__$

$2^3 = _8__$

$2^2 = _4___$

$2^1 = _2___$

$2^0 = _1___$

$2^{-1} = _1/2__$

$2^{-2} = _1/4_$

$2^{-3} = _1/8_$

$2^{-4} = _1/16_$

$2^{-5} = _1/32_$

b) $3^4 = _81__$

$3^3 = _27__$

$3^2 = _9___$

$3^1 = _3___$

$3^0 = __1__$

$3^{-1} = _1/3__$

$3^{-2} = _1/9__$

$3^{-3} = _1/27_$

$3^{-4} = _1/81_$

$3^{-5} = __1/243___$

c) $4^3 = _64__$

$4^2 = _16__$

$4^1 = _4__$

$4^0 = _1__$

$4^{-1} = _1/4_$

$4^{-2} = _1/16__$

$4^{-3} = _1/64_$

$4^{-4} = _1/256_$

$4^{-5} = _1/1024_$

Conclusions:

1. Based on your results above, what conclusions can you draw about

a) the exponent 1?

anything to the exponent 1 is equal to itself

b) the exponent 0?

anything to the exponent 0 is equal to 1

c) negative exponents?

anything to a negative exponent is equal to its reciprocal with a positive exponent

2. Write general rules for your conclusions, using *x* as your base and *m* as your exponent for the rule for negative exponents. The rules have been started for you below.

   a) $x^1 = x$

   b) $x^0 = 1$

   c) $x^{-m} = 1/x^m$

<u>Grading yourself:</u>

Limited - you were able to get all the values on the first page correct. You were able to reach the correct conclusions in #1 a & b and write the correct rules for #2 a & b.

Adequate - you were able to get all the values on the first page correct. You were able to reach the correct conclusions in #1 a & b and write the correct rules for #2 a & b. You were able to draw the correct conclusions and the rule for #1c and #2c after looking at both hints.

Substantial - you were able to get all the values on the first page correct. You were able to draw the correct conclusions in #1 a & b and write the correct rules for #2 a & b. You were able to draw the correct conclusions and the rule for #1c and #2c after looking at one hint.
Excellent - you were able to get all the values on the first page correct. You were able to reach all the correct conclusions in #1 and write the correct rules for #2 without looking at any hints.