

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) $2^5 = \underline{32}$

$2^4 = \underline{16}$

$2^3 = \underline{8}$

$2^2 = \underline{4}$

$2^1 = \underline{2}$

$2^0 = \underline{1}$

$2^{-1} = \underline{1/2}$

$2^{-2} = \underline{1/4}$

$2^{-3} = \underline{1/8}$

$2^{-4} = \underline{1/16}$

$2^{-5} = \underline{1/32}$

b) $3^4 = \underline{81}$

$3^3 = \underline{27}$

$3^2 = \underline{9}$

$3^1 = \underline{3}$

$3^0 = \underline{1}$

$3^{-1} = \underline{1/3}$

$3^{-2} = \underline{1/9}$

$3^{-3} = \underline{1/27}$

$3^{-4} = \underline{1/81}$

$3^{-5} = \underline{1/243}$

c) $4^3 = \underline{64}$

$4^2 = \underline{16}$

$4^1 = \underline{4}$

$4^0 = \underline{1}$

$4^{-1} = \underline{1/4}$

$4^{-2} = \underline{1/16}$

$4^{-3} = \underline{1/64}$

$4^{-4} = \underline{1/256}$

$4^{-5} = \underline{1/1024}$

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

Grading yourself:

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.