

1 as an exponent:

For every number a ,

$$a^1 = a$$

Any number raised
to the first power =
itself

If there is no exponent on a number it
is assumed to be 1

$$a^0 = 1$$
 any number, a , to the
zero power equals 1

EXCEPT:
 a can't be zero.

$$a^{-n} = \frac{1}{a^n}$$
 any number, a ,
raised to a negative
integer power is the
reciprocal of that
number to the
positive power.

EXCEPT a can't
be zero.

Simplify.

$$1. (4Q^3R)^{-1} = \frac{1}{4Q^3R}$$

$$2. \left(\frac{h^6k^7}{c^3}\right)^{-1} = \frac{c^3}{h^6k^7}$$

$$3. \left(\frac{a^{-4}b^{-2}}{g^5}\right)^{-1} = \left(\frac{1}{a^4b^2g^5}\right)^{-1}$$
$$= a^4b^2g^5$$

$$\left(\frac{a^{-4}b^{-2}}{g^5}\right)^{-1} = \frac{g^5}{a^{-4}b^{-2}}$$
$$= a^4b^2g^5$$

Is the value of each expression POSITIVE or NEGATIVE? Write POS or NEG

1. -5^2 NEG
2. $(-4)^8$ POS
3. $-(-6)^4$ NEG
4. -2^3 NEG
5. $(-3)^5$ NEG
6. $-(-7)^{POS}$
7. $(-6)^{-7}$ NEG
8. $(-10)^{-6}$ POS

Evaluate each for $P = -3$ $Q = 6$. Leave non-integer answers as a fraction in reduced form.

$$\begin{aligned}
 6. \quad -5PQ^{-2} &= \frac{-5P}{Q^2} \\
 &= \frac{-5(-3)}{6^2} \\
 &= \frac{15}{36} = \left(\frac{5}{12}\right)
 \end{aligned}
 \qquad
 \begin{aligned}
 7. \quad \frac{P^{-3}}{Q^{-1}} &= \frac{Q}{P^3} \\
 &= \frac{6}{(-3)^3} \\
 &= \frac{6}{-27} \\
 &= -\left(\frac{2}{9}\right)
 \end{aligned}$$

Evaluate each for $P = -3$ $Q = 6$. Leave non-integer answers as a fraction in reduced form.

$$\begin{aligned}
 8. \quad 2P^{-2}Q^2 &= \frac{2Q^2}{P^2} \\
 &= \frac{2(6)^2}{(-3)^2} \\
 &= \frac{2 \cdot 36}{9} = 2 \cdot 4 = 8
 \end{aligned}
 \qquad
 \begin{aligned}
 9. \quad 4^{-2}P^{-1}Q^2 &= \frac{Q^2}{4^2 P} \\
 &= \frac{36}{16 \cdot -3} \\
 &= \frac{36}{-48} = -\frac{3}{4}
 \end{aligned}$$

You can now finish Hwk #8

pages 397-398

problems 17-19, 28, 29, 32, 42-44, 77

Rewrite each problem so that everything has a Negative exponent.

$$1. \frac{m^2 g^5}{c^7} = \frac{c^{-7}}{m^{-2} g^{-5}} \quad 2. 8a^6 b^{-4} = \frac{b^{-4}}{8^{-1} a^{-6}}$$



Properties of Exponents in Chapter 8

- Zero and Negative Exponents $5b^{-3}c^0$
- Multiplying powers with the same base $a^4 a^7 a$
- Raising a power to a power $(m^5)^8$
- Raising a product to a power $(5a^3 b^7)^2$
- Dividing powers with the same base $\frac{n^8}{n^2}$
- Raising a quotient to a power $\left(\frac{x^3}{y^7}\right)^4$



Skills that you will be using in Sec 8-2 are:

Write each number without any exponents.

$$1. 10^3 \quad 1000$$

$$2. 10^6 \quad 1,000,000$$

Write each number as a power of 10 using positive exponents.

$$1. 10,000 = 10^4$$

$$2. 10,000,000 = 10^7$$

Write each number as a fraction and without ANY exponents

$$1. \quad 10^{-2} = \frac{1}{10^2} = \frac{1}{100}$$

$$2. \quad 10^{-5} = \frac{1}{10^5} = \frac{1}{100,000}$$

Write each number as a power of 10 using negative exponents.

$$1. \quad \frac{1}{10,000} = \frac{1}{10^4} = 10^{-4}$$

$$2. \quad \frac{1}{1,000,000} = \frac{1}{10^6} = 10^{-6}$$