Topic: Negative and other exponent rules

Question: Simplify the expression.

$$\frac{x^{-9}}{y^{-9}}$$

Answer choices:

A $\left(\frac{y}{x}\right)^{-9}$

B 1

C $\left(\frac{x}{y}\right)^{9}$

D $\left(\frac{y}{x}\right)^{9}$

Solution: D

Because the exponents in the numerator and denominator are equal, we can rewrite the expression as

$$\frac{x^{-9}}{y^{-9}} = \left(\frac{x}{y}\right)^{-9}$$

Then we'll make the exponent positive by taking the reciprocal of the fraction.

$$\left(\frac{x}{y}\right)^{-9} = \left(\frac{y}{x}\right)^{9}$$

Topic: Negative and other exponent rules

Question: Simplify the expression.

$$\frac{(x^{a-2})^2}{y^{2a-4}}$$

Answer choices:

A 1

B $\left(\frac{x}{y}\right)^{2a-4}$

C x^{2-a}

D $\frac{x^a}{y^{2a-4}}$

Solution: B

The power rule for exponents tells us that

$$(x^a)^b = x^{ab}$$

We'll apply this rule to the expression in the numerator of the fraction, and then we'll simplify the numerator before dividing it by the denominator.

$$\frac{(x^{a-2})^2}{y^{2a-4}}$$

$$\frac{x^{(a-2)2}}{y^{2a-4}}$$

$$\frac{x^{2a-4}}{y^{2a-4}}$$

Then we know that

$$\frac{x^a}{y^a} = \left(\frac{x}{y}\right)^a$$

so we get

$$\left(\frac{x}{y}\right)^{2a-4}$$

Topic: Negative and other exponent rules

Question: Simplify the expression.

$$\frac{(a^2)^3 \cdot (a^{-2})^4}{(b^{-1})^5 \cdot b^3}$$

Answer choices:

A 1

B $\left(\frac{b}{a}\right)^{-2}$

C $\left(\frac{a}{b}\right)^{2}$

D $\left(\frac{b}{a}\right)^{2}$

Solution: D

The power rule for exponents tells us that

$$(x^a)^b = x^{ab}$$

We'll apply this rule to the expression in the numerator and in the denominator of the fraction, and then we'll simplify the resulting expression.

$$\frac{(a^2)^3 \cdot (a^{-2})^4}{(b^{-1})^5 \cdot b^3}$$

$$\frac{a^6 \cdot a^{-8}}{b^{-5} \cdot b^3}$$

When we multiply expressions with like bases, we add the exponents.

$$\frac{a^{6-8}}{b^{-5+3}}$$

$$\frac{a^{-2}}{b^{-2}}$$

Then we know that

$$\frac{x^a}{y^a} = \left(\frac{x}{y}\right)^a$$

so we get

$$\left(\frac{a}{b}\right)^{-2}$$

Then we'll make the exponent positive by taking the reciprocal of the fraction.

$$\left(\frac{a}{b}\right)^{-2} = \left(\frac{b}{a}\right)^{2}$$