Off-Site Learning Packet Day 1

Integral Exponents

If c and d are nonzero real numbers and m and n are integers (positive, negative, or zero), then we have these

Exponent Laws

- $c^m c^n =$ ___c^{m+n}_____
- $\frac{c^m}{c^n} =$ ____c^{m-n}_____
- $(c^m)^n =$ ___c^{mn}_____
- $(cd)^m =$ ___$c^m d^m$_____
- $\left(\frac{c}{d}\right)^m =$ ____$\frac{c^m}{d^m}$_____
- $c^{-n} =$ ___$\frac{1}{c^n}$_____

Example 5:

a) $\pi^{-5}\pi^{-2}$

$\pi^{-7} = \frac{1}{\pi^7}$

b) $(2x)^5$

$2^5 x^5 = 32x^5$

c) $\frac{x^9}{x^4}$

x^5

d) $\left(\frac{7}{3}\right)^{10}$

$\frac{7^{10}}{3^{10}}$

e) $(5^{-3})^2$

$5^{-6} = \frac{1}{5^6}$

f) $\frac{1}{x^{-5}}$

x^5

The exponent laws can often be used to simplify complicated expressions.

Example 6:

a) $(2x^2y^3z)^4$

$2^4x^8y^{12}z^4 = 16x^8y^{12}z^4$

b) $(r^{-3}s^2)^{-2}$

$r^6s^{-4} = \frac{r^6}{s^4}$

c) $\frac{x^5(y^2)^3}{(x^2y)^2}$

$\frac{x^5y^6}{x^4y^2} = xy^4$

Example 7:

Simplify and express without negative exponents.

$$\frac{a^{-2}(b^2c^3)^{-2}}{(a^{-3}b^{-5})^2c}$$

$\frac{a^{-2}b^{-4}c^{-6}}{a^{-6}b^{-10}c} = \frac{a^4b^6}{c^7}$

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Simplify.

1. $n \cdot 3n^2$

2. $v^2 \cdot 2v^2$

2. $n^3 \cdot 3n$

4. $2x^0 \cdot 2x$

5. $2m^0 \cdot 3m^2$

Simplify. Your answer should contain only positive exponents.

6. $(x^{-5}y^5)^0 \cdot x^0y^0$

7. $-n^3 \cdot (-nm^{-3})^0 \cdot -m^{-4}n^3$

8. $(-x^{-4}y^0)^4 \cdot yx^2$

9. $((xy^2)^{-3} \cdot x^{-5}y^5)^3$

10. $-x^0y^3 \cdot (-yx^4)^3 \cdot -yx^5$

Simplify. Your answer should contain only positive exponents with no fractional exponents in the denominator.

11. $\dfrac{ba^{-\frac{3}{2}} \cdot \left(b^{-\frac{5}{4}}\right)^{\frac{1}{4}}}{a^{-1}b^0}$

12. $\dfrac{\left(u^{\frac{4}{3}}v^{\frac{3}{2}}\right)^2 \cdot v^{\frac{3}{2}}}{\left(u^{\frac{3}{2}}v^{\frac{5}{3}}\right)^0}$

13. $\dfrac{\left(x^0y^2 \cdot y^{-\frac{1}{2}}\right)^{-\frac{2}{3}}}{x}$

14. $\dfrac{a^{-\frac{3}{4}}b^{-1}}{\left(ba^{\frac{1}{2}} \cdot ab^{\frac{1}{4}}\right)^{\frac{1}{2}}}$