

Homework

$$12. \quad d) \quad \begin{array}{l} 5\sqrt{6} \\ \sqrt{5^2 \cdot 6} \\ \sqrt{25 \cdot 6} \\ \sqrt{150} \end{array}$$

$$10. \quad f) \quad \sqrt{91}$$

$$e) \quad \begin{array}{l} \sqrt{54} \\ \sqrt{9 \cdot 6} \\ \sqrt{9} \cdot \sqrt{6} \\ 3\sqrt{6} \end{array}$$

Review From Gr. 9



LAWS OF EXPONENTS

Laws Of Exponents



Law #1: Product Rule

$$\underline{b}^m \times \underline{b}^n = \underline{b}^{m+n}$$

- when multiplying powers with the same base you add the exponents

Examples:

$$5^3 \times 5^6 = 5^{3+6} = 5^9$$

$$\underbrace{5 \cdot 5 \cdot 5} \cdot \underbrace{5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5}$$

$$(z^6)(z^4) = z^{6+4} = z^{10}$$

Exercise:

Simplify the following using the laws of exponents

a) $3^2 \times 3^4$

$$3^6$$

b) $4^3 \times 3^4$

$$(3^2)(3^4)$$

c) $(q^7)(q)$

$$q^8$$

d) $p^4 \times p^3 \times p^2$

$$p^9$$

e) $(2x^3)(4x^2)$

$$2 \cdot x^3 \cdot 4 \cdot x^2$$

$$8x^5$$

f) $(3z^3)(6z^{12})$

$$18z^{15}$$

Law #2: Quotient Rule

$$b^m \div b^n = b^{m-n}$$

- when dividing powers with the same base you subtract the exponents

Examples:

$$7^5 \div 7^2 = 7^3 =$$

$$\frac{g^{13}}{g^4} = g^{13-4} = g^9$$

Exercise:

Simplify the following using exponent laws

a) $5^{23} \div 5^{12} = 5^{11}$

b) $\frac{x^{34}}{x^{19}} = x^{15}$

c) $e^3 \div e^2$

d) $\frac{12x^3}{4x} = 3x^2$

e) $\frac{25c^{30}}{5c^{23}} = 5c^7$

Law #3: Power Rule

when raising a power to another power...MULTIPLY the exponents."

$$(b^m)^n = b^{mn}$$

$$(3^2)^4 = (3^2)(3^2)(3^2)(3^2) = 3^8$$

Law #4: Power of Product

when a product is raised to a power, each of the factors are raised to the power."

$$(ab)^n = a^n b^n$$

- when brackets are involved you must multiply the exponents

Examples:

$$(5^3)^5 = 5^{3 \cdot 5} = 5^{15}$$

$$(m^8)^4 = m^{8 \cdot 4} = m^{32}$$

$$(e^2 f)^3 = e^{2 \cdot 3} f^{1 \cdot 3} = e^6 f^3$$

Exercise:

Simplify the following using Laws of Exponents

a) $(m^3)^4 = m^{12}$

b) $(x^2 y^4)^3 = x^6 y^{12}$

c) $(2d^3)^3 = 8d^9$

d) $(2m^3 n^2)^3 = 8m^9 n^6$

Law #5: Power of Quotient Rule

when a quotient is raised to a power, both the divisor and the dividend are raised to the power."

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

Examples:

$$\left(\frac{2}{3}\right)^5 = \frac{2^5}{3^5} = \frac{32}{243}$$

$$b^4 \cdot b^{-4}$$

$$b^0 = 1$$

Law #6: Zero Rule

$$b^0 = 1$$

- any power raised to the exponent 0 (zero) is equal to 1

Homework:

P1- Handout #1-18

P2- Handout- all of pg.3