Grade 9
Exponents WorkBook

Question 1 Exponent Practice [22]

Simplify and express your answer with positive exponents:

a) $(x^{-2})^3$ (2)

b) $(2^2x^3)^2$ (2)

c) $\frac{p^{-8}}{q^3}$ (2)

d) $6(p+q)^0$ (2)

e) $-6p^2q \times 2pq^3 \times -pq^{-1}$ (3)

f) $\frac{x^2y^3 \times y^2x^4}{x^8y^3}$ (3)

g) $-3(2a^3)^3$ (3)

h) $\frac{(-2a^2b^{-3})^3 a^2b^5}{2a^7b^{-5}}$ (5)

Question 2 Exponent Practice [20]

Simplify and express your answer with positive exponents:

a) $(-3x^{-2}y^5)^4$ (3)

b) $\frac{3^5.2^2}{2^5.3^2}$ (3)

c) $\frac{m^3n^4}{nm^5}$ (2)

d) $(x^3y^2)^3(x^{-3}y^5)$ (3)

e) $a^{x+3}.a^{2-x}$ (2)

f) $\left(\frac{a}{c}\right)^{\frac{1}{2}} \times \left(\frac{c}{a}\right)^{\frac{1}{2}}$ (2)

g) $\frac{(6m^4n^5)(-3m^5n)^3}{12m^6n^9}$ (5)

Question 3 Exponent Practice [25]

Simplify and express your answer with positive exponents:

a) $7x^0$ (1)

b) $x^2(x^3 - \frac{1}{x^3} + x^{-2})$ (4)

c) $\frac{3a^0b^{-2}}{6a^3}$ (3)

d) $(-3x^2y)(-2x^3)(x^4y)^2$ (3)

e) $(x^3y^9)^{-\frac{1}{3}}.(xy^{-3})^0$ (4)

f) $\frac{(2ab^2c)^{-1}\times(2a^3b^2)^2}{(2^{-1}ab^{-2}c^0)^2}$ (5)

g) $\frac{(a^4)^{n+1}.(a^2b)^{-3}}{(ab)^{-2n}.b^{-n}}$ (5)

Question 4 Roots [13]

Simplify the following:

a) $\sqrt{36x^4y^6}$ (3)

b) $\sqrt{\frac{x^4y^{-8}}{81}}$ (3)

c) $\sqrt{\frac{(-2ab^2)^4}{(-b^2)^2}}$ (4)

d) $\sqrt{16x^2+9x^2}$ (3)

Question 5 Scientific Notation [8]

5.1 Write in scientific notation:

a) $672{,}12$ (2)

b) $0{,}000000235$ (2)

5.2 Write in standard form:

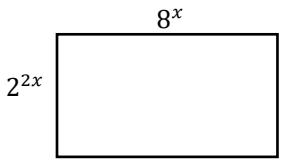
a) $2{,}35 \times 10^3$ (2)

b) $1{,}23 \times 10^{-6}$ (2)

Question 6 Challenges Practice [16]

a) If $x = -1$ and $y = 1$, then what is $x^{101} + y^{200}$ equal to? (3)

b) Calculate the area of the rectangle ($area = length\ x\ breadth$): (3)



c) A certain bacteria doubles in size every hour. If the initial population is 500 bacteria, the number of bacteria after t hours is given by the formula:

$$p = 500 \times 2^t$$

i) How many bacteria will there be after 6 hours? (3)

ii) Express your answer in scientific notation. (2)

d) A box has the following dimensions:

- Length: 8^x
- Breadth: 4^{x+1}
- Height: 2^{3x}

i) Express the volume of the box as a power of 2. (3)

ii) If x = 3, calculate the volume of the box. (2)