

Math 9: Exponent Rules Quiz

Full credit will only be awarded for all work shown in a neat and organized manner.

1. Are the following expressions true or false? (Circle T or F)

If false, **explain** why and **correct** the answer

a) $\left(\frac{4}{5}\right)^3 = \frac{12}{15}$ T / F

$$\left(\frac{4}{5}\right)^3 = \frac{4^3}{5^3} = \frac{64}{125}$$

power of a quotient

b) $2^5 \times 2^5 = 2^{10}$ ✓ T / F

e) $(5^8)^2 = 5^{10}$ T / F

$$(5^8)^2 = 5^{8 \times 2} = 5^{16}$$

power of a power

f) $(4^3 \times 5^2)^6 = 4^9 \times 5^8$ T / F

$$(4^3)^6 \times (5^2)^6 = 4^{18} \times 5^{12}$$

power of a product

2. Simplify using exponent rules. Leave in
- Exponential Form**

a) $5^3 \times 5^5$

$$5^{3+5} = 5^8$$

$$\underline{5^8}$$

b) $4^2 \times (-4)^3 = 4^2 \times -4^3$

$$\underline{-4^5}$$

c) $8^9 \div 8^1$

$$= 8^{9-1}$$

$$\underline{8^8}$$

d) $\frac{7^4 \times 7^0}{7^2} = \frac{7^{4+0}}{7^2}$

$$= \frac{7^4}{7^2} =$$

$$\underline{7^2}$$

e) $\frac{3^7 \times 2^8}{(-2)^2 \times (-3)^5}$

$$= -3^{7-5} \times 2^{8-2}$$

$$\underline{-3^2 \cdot 2^6}$$

f) $4^{3a-2} \div 4^{a-5}$

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

$$= 4^{(3a-2) + (-a+5)}$$

$$\underline{4^{2a+3}}$$

g) $(8^5 \times 8^2)^3$

$$(8^7)^3$$

$$\underline{8^{21}}$$

h) $\left(\frac{7^5}{9^2}\right)^2 = \frac{(7^5)^2}{(9^2)^2}$

$$\underline{\frac{7^{10}}{9^4}}$$

3. Simplify using exponent rules, then Evaluate (Answer with just a number)

a) $2^7 + 2^0 - 2^2 \times 2^3$

$$2^{7-0} - 2^{2+3}$$

$$2^7 - 2^5 = 128 - 32$$

$$\underline{96}$$

b) $7^5 + 7^3 \times 7 = 7^{5-3} \times 7^1$

$$= 7^2 \times 7^1$$

$$= 7^3$$

$$\underline{343}$$

c) $3^6 \div 3^3 + (3^2 - 3)^3$

$$= 3^{6-3} + (9-3)^3$$

$$= 3^3 + 6^3$$

$$= 27 + 216$$

$$\underline{243}$$

d) $\frac{(-3)^3 + 3^4}{-3^2} = \frac{-27 + 81}{-9}$

$$= \frac{54}{-9}$$

$$\underline{-6}$$

e) $\left(\frac{5^6}{(-5)^5}\right)^3 = \left(\frac{5^6}{-5^5}\right)^3$

$$= (-5)^3$$

$$= -5^3$$

$$\underline{-125}$$

f) $-(4 + 2^3)^2 = -(4 + 8)^2$

$$= -(12)^2$$

$$\underline{-144}$$

4. Solve for a

a) $(2^a)^3 = 2^9$

$$\Rightarrow 2^{3a} = 2^9$$

$$\div 3 \quad 3a = 9 \div 3$$

$$a = 3$$

$$a = \underline{3}$$

b) $\frac{4^{a+6}}{4^{a+1}} = 4^{2a+1}$

$$\Rightarrow 4^{(a+6)} - (a+1) = 4^{2a+1}$$

$$\Rightarrow 4^{(a+6)} + (-a-1) = 4^{2a+1}$$

$$4^5 = 4^{2a+1}$$

$$a = \underline{2}$$

$$\begin{matrix} -1 & & -1 & & \div 2 & & \div 2 \\ 5 & = & 2a+1 & \Rightarrow & 4 & = & 2a \\ & & & & 2 & = & a \end{matrix}$$