

1. Rewrite each expression using only positive exponents.

a. 4^{-3}

b. $(-7)^{-2}$

c. x^{-5}

d. $12x^{-4}$

e. $\frac{m^{-1}}{n}$

f. $-5m^6n^{-9}$

g. $\frac{3s^{-7}w^8}{4}$

h. $\frac{6xy^{-1}z^2}{7m}$

i. $\frac{x^{-3}yz^{-2}}{m}$

2. Simplify (DO NOT EVALUATE.)

a. $y^{14} \times y^{-6}$

b. $5^8 \div 5^{-2}$

c. $\frac{(4x^2)^2}{2x}$

d. $(x^3y^5)(x^{-4}y^{-3})$

3. Evaluate the following without using a calculator.

a. $4^0 + 2^{-1}$

b. $3^{-2} + 2^{-3}$

4. Ms. Frankel has been working for the same company for 15 years. She has received a 4.5% raise each year since she started. Her current salary is \$42,576.

a. Write an expression of the form $42,576(1 + 0.045)^x$ for Ms. Frankel's current salary.

b. What does the expression $42,576(1 + 0.045)^{-7}$ represent in this situation?

c. Write and evaluate an expression for her salary 15 years ago.

d. Write expressions without negative exponents that are equivalent to the exponential expressions from 4b and c.

5. Evaluate each expression without using a calculator. Then check your answers with your calculator.

a. 2^{-5}

b. $(4^{-3})(9^0)$

c. $(-6)^{-2}$

d. $x^0(-2)^{-3}$

e. $27(3^{-3})$

f. $-45(3^{-2})$

6. $2x^3y^{-3} \cdot 2x^{-1}y^3$

7. $4a^3b^2 \cdot 3a^{-4}b^{-3}$

8. $(4r^0)^4$

9. $(2x^2)^{-4}$

10. $(x^2)^0$

11. $x^2y^{-4} \cdot x^3y^2$

12. $\frac{3m^{-4}}{m^3}$

13. $\frac{2h^3j^{-3}k^4}{3jk}$

14. $\frac{4x^0y^{-2}z^3}{4x}$