

**Evaluate Expressions**

Algebraic expressions containing negative exponents can be written using positive exponents and then evaluated.

Order of Operations

Remember to follow the order of operations when evaluating expressions.

Example 4

Evaluate $4a^{-5}$ if $a = -2$.

$$\begin{aligned}
 4a^{-5} &= 4 \cdot (-2)^{-5} && \text{Replace } a \text{ with } -2. \\
 &= 4 \cdot \frac{1}{(-2)^5} && \text{Definition of negative exponent} \\
 &= 4 \cdot \frac{1}{-32} && \text{Find } (-2)^5. \\
 &= \cancel{4}^1 \cdot \frac{1}{\cancel{32}^{-8}} && \text{Simplify.} \\
 &= \frac{1}{-8} && \text{Simplify.}
 \end{aligned}$$

4b $6(4)(3)^{-4}$
 $6(4)(\frac{1}{81})$
 $\frac{24}{81} = \frac{8}{27}$

Got It? Do these problems to find out.

Evaluate each expression if $m = 4$ and $n = 3$.

4a. m^{-2}
 $(4)^{-2} = \frac{1}{4^2} = \frac{1}{16}$

4b. $6mn^{-4}$

4c. $-n^{-3}$

4d. $-4m^{-2}$

4c -3^{-3}
 $-\frac{1}{3^3} = -\frac{1}{27}$

4d $-4(4)^{-2}$
 $-\frac{4}{1} \cdot \frac{1}{16} = -\frac{4}{16} = -\frac{1}{4}$

Guided Practice

Write each expression using a positive exponent. (Example 1)

1. 6^{-2}

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

3. x^{-5}

4. b^{-7}

Write each fraction as an expression using a negative exponent other than -1 . (Example 2)

5. $\frac{1}{2^6}$

6. $\frac{1}{8^2}$

7. $\frac{1}{9}$

8. $\frac{1}{36}$



9. When a baseball is hit, it comes in contact with the bat for less than 0.001 of a second. Write 0.001 using a negative exponent other than -1 . (Example 3)

Evaluate each expression if $x = -4$ and $y = 2$. (Example 4)

10. y^{-7}

11. x^{-3}

12. 3^x

13. $8y^{-4}$

Independent Practice

Go online for Step-by-Step Solutions



Write each expression using a positive exponent. (Example 1)

14. 11^{-6}

15. 7^{-1}

16. $(-4)^{-5}$

17. $(-5)^{-4}$

18. a^{-2}

19. k^{-8}

20. b^{-15}

21. r^{-20}

Write each fraction as an expression using a negative exponent other than -1 . (Example 2)

22. $\frac{1}{9^4}$

23. $\frac{1}{10^3}$

24. $\frac{1}{7^6}$

25. $\frac{1}{6^5}$

26. $\frac{1}{4}$

27. $\frac{1}{49}$

28. $\frac{1}{144}$

29. $\frac{1}{125}$