Challenge Practice
For use with the lesson "Define and Use Zero and Negative Exponents"

In Exercises 1–5, *a* and *b* are real numbers such that *a* > 0 and *b* > 0. Tell whether the statement is *always true*, *sometimes true*, or *never true*. If it is sometimes true, give a pair of values for which it is true and a pair of values for which it is false.

1. $\dfrac{a^{-3}}{b^{-4}} = \dfrac{b^4}{a^3}$

2. $(a + b)^{-2} = a^{-2} + b^{-2}$

3. $(a^2 + b^2)^{1/2} = a + b$

4. $(a^2 + b^2)^2 = a^4 + 2a^2b^2 + b^4$

5. $a + b = a^2 + b^2$

6. Determine which positive values of a make $a^{-3} > a^{-4}$ a true statement.

In Exercises 7–10, evaluate the given expression for the given values of *a*.

7. $\dfrac{[(a + 1)^{-2}]^3}{[(a - 1)^{-3}]^2}; a = 0$

8. $\dfrac{[(a^2 + 3)^{a-2}]^3}{[(a - 1)^2]^4}; a = 2$

9. $[(a + 2)^a]^{a-1} - 2^{a+1}; a = 0$

10. $\dfrac{(a^a)^{-2a}}{(a + 1)^{-a}}; a = 2$