Assignment: Divide Powers

Part I: Practice dividing powers

Use division to simplify each expression. Be sure to write each answer in its simplest form, with positive exponents only. Show all work leading to your answer.

1. $\dfrac{4a^7}{a^3}$

2. $\dfrac{b^2}{5b^{10}}$

3. $\dfrac{3m^5 n^2}{m^4}$

4. $\dfrac{x^2 y^9}{2x^3 y^6}$

5. $\dfrac{a^3 b^2 c}{a^3 bc^5}$

6. $\dfrac{3pq^3}{4p^4 q^8 r}$

7. $\dfrac{14f^7 gh^8}{7g^2 h^{11}}$

8. $\dfrac{2x^{12} y^4 z^{10}}{10x^9 y^{15} z^2}$

Part II: Dividing Powers to Solve Real-world Problems

Set up and simplify a division of powers expression to solve each problem. Give your answer in both exponential form and as a whole number, showing all work leading to your answer. Then write a sentence to explain your answer.

9. The population of the African country Uganda has been growing at a steady rate for several decades. Assuming that the current population is about 2^{25} million and that the country has an approximate land area of 2^{17} square miles, about how many people per square mile live in Uganda?

10. An important source of food for whales, seals, and penguins that live in and around Antarctica is a shrimp-like crustacean called krill. Suppose a group of research scientists estimate that there are approximately 3^{15} individual krill in a 3^7 cubic meter section of the Antarctic Ocean. About how many krill are there per cubic meter in this part of the ocean?