

2. Let  $m$  be a whole number.

(a) Use the properties of exponents to write an equivalent expression that is a product of unique primes, each raised to an integer power.

$$\frac{6^{21} \cdot 10^7}{30^7}$$

(b) Use the properties of exponents to prove the following identity:

$$\frac{6^{3m} \cdot 10^m}{30^m} = 2^{3m} \cdot 3^{2m}$$

(c) What value of  $m$  could be substituted into the identity in part (b) to find the answer to part (a)?