Name: _____   Date: _____

Section 6.1 The Exponent Rules

1. Use the exponent rules to express each of the following as a single power.
   a) $11^5 \times 11^8$ **b)** $3^3 \times 3^6$
   c) $\left(\frac{1}{4}\right)^4 \times \left(\frac{1}{4}\right)^4$ **d)** $(-2)^6(-2)^4$

2. Use the exponent rules to express each of the following as a single power.
   a) $9^8 \div 9^6$ **b)** $5^{10} \div 5^5$
   c) $\dfrac{6^8}{6^5}$ **d)** $\dfrac{(-10)^{13}}{(-10)^6}$

3. Use the exponent rules to express each of the following as a single power.
   a) $(5^3)^5$ **b)** $(8^6)^4$ **c)** $(12^5)^9$ **d)** $[(-2)^2]^3$

4. Use the exponent rules to express each of the following as a single power.
   a) $\dfrac{6^2 \times 6^4}{6^3}$ **b)** $\dfrac{(-4)^9 \times (-4)^5}{[(-4)^3]^4}$
   c) $\dfrac{(0.1)^7}{(0.1)^4}$ **d)** $\dfrac{\left(\frac{1}{2}\right)^{10}}{\left(\frac{1}{2}\right)^4 \times \left(\frac{1}{2}\right)^2}$

5. Use the exponent rules to simplify each algebraic expression.
   a) $(p^2)^3$ **b)** $(4xy^3)(x^4y^3)$ **c)** $\dfrac{42x^6y^7}{7x^5y}$

6. Consider the expression $3^8 \times 3^8$.
   a) Simply the expression using the exponent rules.
   b) Write the product as the power of a power in two different ways.
   c) Write the product as the product of 3^3 and another power.

7. Evaluate and simplify each of the following without using a calculator.
   a) $[(0.2)^2]^2$ **b)** $\dfrac{\left(\frac{2}{5}\right)^9}{\left(\frac{2}{5}\right)^6}$

8. The Richter scale measures the magnitude of an earthquake. Each number on the scale is the exponent of the magnitude, using a base of 10. An earthquake measuring 8.0 on the Richter scale is 10 times stronger than an earthquake measuring 7.0.
   a) Compare the magnitude of an earthquake measuring 4.0 on the Richter scale with the magnitude of an earthquake measuring 7.0 on the Richter scale.
   b) Suppose an earthquake has a magnitude that is 10 000 times greater than that of an earthquake measuring 1.0 on the Richter scale. What is the magnitude of this earthquake on the Richter scale?

9. Recall that:
   $$\text{probability} = \frac{\text{number of favourable outcomes}}{\text{number of possible outcomes}}$$
   a) When you flip a coin twice, what is the probability that it will land heads up both times?
   b) When you flip a coin 10 times, what is the probability that it will land in the sequence HTHTHTHTHT?

10. Use the exponent rules to simplify each expression.
   a) $6^a \times 6^b$ **b)** $10^{ab} \div 10^{bc}$
   c) $\dfrac{(-8)^{ab} \times (-8)^{ab}}{[(-8)^b]^a}$