Secondary 2 Mathematics · Practice Worksheet · tutorinmontreal.ca

# Exponents, Roots, Factors and Multiples

Name: _____ Date: _____

## Concepts

- Divisors, Multiples and Factorization
- Exponential Notation
- Exponents - Secondary 1 and 2
- Factoring a Number
- Methods for Finding the LCM and the GCF Simultaneously
- Properties of Operations
- Square and Cubic Numbers - Secondary 1 and 2
- The Greatest Common Factor (GCF)
- The Least Common Multiple (LCM)
- The Root of a Number | Secondary 1 and 2

### Divisors, Multiples and Factorization

**1.** The lockers in a Laval school are numbered starting at 1.

**a)** List all the divisors of 84.

**b)** List every multiple of 14 between 50 and 120.

**c)** Use the divisibility rules to say whether locker number 3150 is divisible by 6, by 9, and by 4. Give the rule you used each time.

**d)** Name a locker number that is at the same time a divisor of 84 and a multiple of 14.

### Exponential Notation

**2.**

**a)** Write $7 \times 7 \times 7 \times 7$ in exponential notation, then name the base and the exponent.

**b)** Write $2^6$ in expanded form and give its value.

**c)** Evaluate $3^4$, $5^3$, $10^4$ and $1^9$.

**d)** A sheet of paper is folded in half over and over. Each fold doubles the number of layers, so after $n$ folds there are $2^n$ layers. How many layers are there after 7 folds?

### Exponents - Secondary 1 and 2

**3.**

**a)** Evaluate $2^5$, $3^3$, $6^2$ and $10^3$.

**b)** Place $2^6$, $3^4$, $4^3$ and $5^2$ in order from smallest to largest. If two of them are equal, say so.

**c)** In a video game, a player's score is $4^5$ points and a teammate's is $5^4$ points. Who has the higher score, and by how many points?

### Factoring a Number

**4.**

**a)** Break 540 down into a product of prime factors, using a factor tree. Write the result in exponential notation.

**b)** Do the same for 392.

**c)** One of 51, 53, 57 and 91 is prime. Which one? For each of the other three, give a factorization that proves it is not prime.

### Methods for Finding the LCM and the GCF Simultaneously

**5.** Use the simultaneous division method: write the two numbers side by side and keep dividing by a prime that divides at least one of them, carrying down anything that does not divide.

**a)** Apply the method to 84 and 126, then state the GCF and the LCM.

**b)** Apply it to 45 and 60, then state the GCF and the LCM.

**c)** Check one of your LCMs by showing it is a multiple of both starting numbers.

### Properties of Operations

**6.** Compute each one mentally, then name the property of operations that made it easy.

**a)** $25 \times 17 \times 4$

**b)** $8 \times 47 + 8 \times 53$

**c)** $6 \times 98$

**d)** $(36 + 59) + 41$

### Square and Cubic Numbers - Secondary 1 and 2

**7.**

**a)** List every perfect square between 100 and 200.

**b)** Which of 216, 300 and 512 are perfect cubes? Show your reasoning.

**c)** A square section of a skatepark has an area of 169 $m^2$. Find the length of its side and its perimeter.

**d)** A cube-shaped storage bin has a volume of 343 $cm^3$. Find the length of one edge.

### The Greatest Common Factor (GCF)

**8.**

**a)** Find the GCF of 48 and 72.

**b)** Find the GCF of 54, 90 and 126.

**c)** A student council has 96 muffins and 144 clementines to share into identical snack bags, using everything up. What is the greatest number of bags they can make, and what goes into each bag?

### The Least Common Multiple (LCM)

**9.**

**a)** Find the LCM of 12 and 18.

**b)** Find the LCM of 8, 12 and 20.

**c)** At a market, one supplier delivers every 9 days and another every 12 days. Both delivered today. In how many days will they next deliver on the same day, and how many times will that happen over the next 180 days?

### The Root of a Number | Secondary 1 and 2

**10.**

**a)** Evaluate $\sqrt{196}$, $\sqrt{625}$, $\sqrt[3]{125}$ and $\sqrt[3]{1000}$.

**b)** A square banner has an area of 324 $\text{cm}^2$. How long is each side?

**c)** A cube-shaped crate has a volume of 512 $\text{cm}^3$. Find the length of an edge, then find the total area of its six faces.

### Synthesis — drawing on several sheets in this topic

**11.** Two numbers are given: 360 and 84.

**a)** Write each as a product of prime factors, in exponential notation.

**b)** Use those factorizations to find the GCF and the LCM of the two numbers.

**c)** Check your two answers using the relationship GCF $\times$ LCM = the product of the two numbers.