

Divisibility, Factors and Multiples

Name: _____

Date: _____

Concepts

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

Divisibility Rules

1. For each number below, say which of 2, 3, 4, 5, 6, 9 and 10 divide it. Name the rule you used each time — do not do the divisions.

a) 1 260

b) 4 095

c) 2 736

Divisors, Multiples and Factorization

2. Answer each part and show the pairing or the multiplication you used.

- a) List all the divisors of 84.
- b) List the first six multiples of 14, starting at 14.
- c) Is 84 a multiple of 14? Is 84 a divisor of 168? Justify both answers with one multiplication each.

Exponential Notation

3. Use exponential notation carefully.

- a) Write $7 \times 7 \times 7 \times 7$ as a power, then give its value.
- b) Write $2 \cdot 2 \cdot 2 \cdot 5 \cdot 5$ as a product of two powers, then give its value.
- c) In 6^3 , name the base and name the exponent, and read the power aloud in words.
- d) Evaluate 3^4 and 5^3 .

Exponents — Secondary 1 and 2

4. Evaluate, respecting the order of operations.

a) 4^3

b) 10^4

c) 1^{12}

d) $6^2 - 5^2$

e) $2 + 3 \times 4^2$

Factoring a Number

5. Build a factor tree for each number, then write its prime factorization in exponential notation, with the prime factors in increasing order.

a) 360

b) 588

c) 1 000

Methods for Finding the LCM and the GCF Simultaneously

6. For each pair, divide both numbers side by side by a common prime factor, again and again, until the two numbers left share no common factor. Then read off the GCF and the LCM from your work.

- a) 84 and 126
- b) 60 and 96

Square and Cubic Numbers — Secondary 1 and 2

7. Answer using the meaning of a square number and of a cubic number.

- a) List every square number from 100 to 300.
- b) List every cubic number from 1 to 500.
- c) Find a number less than 100, other than 1, that is both a square number and a cubic number, and show both ways of building it.

The Greatest Common Factor (GCF)

8. For a science fair, Amélie has 90 blue LEDs and 126 red LEDs. She wants to build identical kits, using every LED and leaving none over.

- a) Write 90 and 126 as products of prime factors, and use them to find the GCF.
- b) What is the greatest number of kits she can build?
- c) How many blue and how many red LEDs go into each kit?

The Least Common Multiple (LCM)

9. Two buses leave the Longueuil terminus together at 6:00. The 51 leaves every 18 minutes and the 24 leaves every 24 minutes, all morning.

- a) Find the LCM of 18 and 24 using prime factorization.
- b) At what time do the two buses next leave together?
- c) List every time before 11:00 at which they leave together.

The Properties of Natural Numbers

10. Consider 1, 2, 27, 41, 49, 51, 64 and 91.

- a) Sort them into prime, composite, and neither. For each composite number, give one factor pair.
- b) Which of them are square numbers?
- c) Which of them are odd?

The Root of a Number | Secondary 1 and 2

11. Evaluate without a calculator, and show the perfect square you recognized.

- a) $\sqrt{169}$
- b) $\sqrt{2\,500}$
- c) $\sqrt{36} + \sqrt{64}$
- d) $\sqrt{9 \times 16}$
- e) A square vegetable garden has an area of 225 m^2 . Find the length of one side, then the length of fence needed to go around it.

Synthesis — drawing on several sheets in this topic

12. A rectangular concrete slab at a skatepark measures 168 cm by 252 cm. It is to be covered exactly by identical square tiles, laid in full rows and columns, with no tile cut.

- a) Write 168 and 252 as products of prime factors.
- b) What is the largest possible side length of a tile? Justify using the two factorizations.
- c) How many tiles of that size are needed? Check your count using the areas.

Want the harder problems and the worked solutions?

The *Challenge Problems* set and the *Answer Keys* for Divisibility, Factors and Multiples — with the reasoning written out in full — are available at tutorinmontreal.ca.