UNIT 1: ROOTS AND POWERS

SECTION 3.1: FACTORS AND MULTIPLES OF WHOLE NUMBERS

K. Sears
NUMBERS, RELATIONS AND FUNCTIONS 10

WHAT'S THE POINT OF TODAY'S LESSON?

We will begin working on the NRF 10 Specific Curriculum Outcome (SCO) "Algebra and Numbers 1" OR "AN1" which states:

"Demonstrate an understanding of factors of whole numbers by determining the prime factors, greatest common factor, least common multiple, square root and cube root."

What does THAT mean???

SCO AN1 means that we will:

* **find the prime factors of whole numbers like 8 (2^3 or $2 \cdot 2 \cdot 2$)**
* **determine the greatest common factor (GCF) of numbers like 28 and 49 (GCF = 7)**
* **determine the least common multiple (LCM) of numbers like 6 and 9 (LCM = 18)**
* **determine if a given whole number is a perfect square, like 25 ($5 \cdot 5$) or a perfect cube, like 8 ($2 \cdot 2 \cdot 2$)**
* **determine the square root of perfect squares, like 36 ($\sqrt{36} = 6$), and the cube root of perfect cubes, like 64 ($\sqrt[3]{64} = 4$)**

WARM UP:

Use prime factorization to determine the

a) GCF of 856, 1200 and 1368

b) LCM of 28, 42 and 63

WARM UP:

Greatest Common Factor

a) GCF of 856, 1200 and 1368:

856

Factor Trees

2×428

$2 \times 4 \times 107$

$2 \times 2 \times 2 \times 107$

Prime Factors

1200

2×600

$2 \times 20 \times 30$

$2 \times 4 \times 5 \times 5 \times 6$

$2 \times 2 \times 2 \times 5 \times 5 \times 3 \times 2$

1368

2×684

$2 \times 2 \times 342$

$2 \times 2 \times 2 \times 171$

$2 \cdot 2 \cdot 2 \cdot 3 \cdot 57$

$2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \times 19$

GCF

$2 \times 2 \times 2$

$2 \times 2 \times 2 \times 2 \times 3 \times 5 \times 5$

$2 \times 2 \times 2 \times 3 \times 3 \times 19$

107

GCF $= 2 \times 2 \times 2$

$= 8$

WARM UP:

LCM Least Common Multiple

b) LCM of 28, 42 and 63:

56, 84, 112

28

4×7

$2 \times 2 \times 7$

42

2×21

$2 \times 3 \times 7$

63

3×21

$3 \times 3 \times 7$

GCF $= 7$

* LCM $= 2^2 \times 3^2 \times 7$

$= 252$

WARM UP:

$\frac{4}{16} \overset{\div 4}{=} \frac{1}{4}$ ↑ GCF

a) What is the GCF of 340 and 380?

b) Reduce the fraction $\frac{340}{380}$ to its simplest form. $\div 20$ GCF

$\frac{34}{38}$ $\frac{17}{19}$

c) What is the LCM of 340 and 380?

d) What is $\frac{15}{340} + \frac{10}{380}$? ✓ Common denominator = LCM

680 1020

340
2 x 170
2 x 2 x 85
2 x 2 x 5 x 17

380
2 x 190
2 x 2 x 95
2 x 2 x 5 x 19

GCF = $2^2 \times 5$
= 4 x 5
= 20

LCM = $2^2 \times 5 \times 17 \times 19$
= 6460

a) GCF

$340 = 34 \cdot 10 = 2 \cdot 17 \cdot 2 \cdot 5$

$380 = 38 \cdot 10 = 2 \cdot 19 \cdot 2 \cdot 5$

$GCF = 2 \cdot 2 \cdot 5$
$= 4 \cdot 5$
$= 20$

b) $\frac{340}{380} \div 20 \div 20$

$= \frac{17}{19}$

c) LCM

$340 = 34 \cdot 10 = 2 \cdot 17 \cdot 2 \cdot 5 = 2^2 \cdot 5 \cdot 17$

$380 = 38 \cdot 10 = 2 \cdot 19 \cdot 2 \cdot 5 = 2^2 \cdot 5 \cdot 19$

$LCM = 2^2 \cdot 5 \cdot 17 \cdot 19$
$= 4 \cdot 5 \cdot 17 \cdot 19$
$= 20 \cdot 17 \cdot 19$
$= 340 \cdot 19$
$= 6460$

d) $\frac{15}{340} \times \frac{19}{19} + \frac{10}{380} \times \frac{17}{17}$

$= \frac{285}{6460} + \frac{170}{6460}$

$= \frac{455}{6460} \div 5 \div 5$

$= \frac{91}{1292}$

VOCABULARY:

prime number: a whole number with exactly two factors, itself and 1.
EX.: 2, 3, 5, 7, 11, 13, 17, 19, 23, and 29 are the first 10 prime numbers.

composite number: a number with three or more factors.
EX.: 8 is a composite number; it has four factors (1, 2, 4 and 8).

prime factor: a prime number that is a factor of a number.
EX.: The prime factors of 30 are 2, 3, and 5.

prime factorization: writing a number as a product of its prime factors.
EX.: The prime factorization of 20 is $2 \cdot 2 \cdot 5$ or $2^2 \cdot 5$.

bottom of tree

CONCEPT REINFORCMENT:

"FOUNDATIONS AND PRE-CALCULUS - MATHEMATICS 10" (FPCM 10)

pages 140 / 141: #3 TO #13, #15 TO #19a and ~~#20~~ omit

15 a, c, e

16 a