Section 3.1: Factors and Multiples of Whole Numbers

Learning Outcome

3A: I can determine the prime factorization of a number

Factors:

What is a factor of a number? Whole number divisors of a number (numbers that divide evenly into another number)

Factors of 8: 1,2,4,8_ Factors of 24: _____

Prime numbers:

PRIME NUMBERS are numbers that only have _____ factors

In the table we will highlight all of the numbers that are prime numbers – be careful!

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

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You will need to know how to determine the PRIME FACTORIZATION of a number. This means, you are writing the number as a product of its prime factors.

Example 1: Write the prime factorization of 240.

Solution #1: As a factor tree…

Solution #2: using repeated division by primes

Exercise: Write the prime factorization of 510.

Solution #1: As a factor tree…

Solution #2: using repeated division by primes

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Learning Outcome:

3B: Finding the GCF and LCM of numbers

In this section, will need to know how to find the following things when you are given two or more numbers:

a) G.C.F. (_____) – the greatest factor that the numbers have in _____.

b) L.C.M. (_____) – the smallest number that is _____ of each number.

Example 2: Determine the G.C.F. and L.C.M. of 40 and 25.

GCF: Solution #1: Using divisibility	Solution #2: Using PRIME factorization
40 is divisible by…. 25 is divisible by… Therefore, the GCF is: _____	
LCM: Solution #1: Using divisibility	
Multiples of 40: _____, _____, _____, _____, _____, _____, _____, _____, _____, _____, _____,… Multiples of 25: _____, _____, _____, _____, _____, _____, _____, _____, … Therefore, the LCM is: _____	For **GCF**, circle the factors that appear in EACH of the prime factorizations. Therefore: The GCF is:_____. For **LCM**, find the greatest power of EACH prime factor in the list. Therefore: The LCM is: _____.

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Example 3: Find the G.C.F. and L.C.M. of the following sets of numbers using the *"L Bracket"* method. You can also confirm your answers by using the prime factorization method you learned from Example 2.

a) 28 and 40 (same as example #2)

b) 81 and 54

Example 4: Find the G.C.F. and L.C.M. of the following sets of numbers using the *"L Bracket"* method. In these examples, you are dealing with 3 numbers!

a) 50, 100 and 625

b) 256, 216 and 78

Example 5: You are planning a summer barbeque. You are of course going to have some hamburgers at the barbeque. Cheese makes everything better, so you are also going to buy cheese for your guests to put on their hamburgers. At the grocery store you find that beef burger patties come in packs of 12, cheese slices are in packs of 20 and, buns come in packs of 8. Assuming everyone makes the right decision to have cheeseburgers, how many of each will you need to buy in order to make sure there are an equal number of everything?

Example 6: What is the side length of the smallest square that could be tiled with rectangles that measure 12 inches by 18 inches? Assume the rectangles cannot be cut and also give a sketch of your answer.

Example 7: A builder wants to cover a wall measuring 28 feet by 42 feet with square pieces of plywood. What is the side length of the largest square that could be used to cover the wall? (Note: you can't cut the squares) How many square pieces of plywood would be needed?

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(6, 8 -11) do at least 3 from each
13, 17, 19, 20
21, 22