Algebra I
Lesson 9-1

- I can find prime factorizations of integers and monomials.
- I can find the greatest common factor of integers and monomials.

Prime and Composite Numbers

A prime number is a whole number, greater than one, whose only factors are one and itself

A composite number is a whole number, greater than one, that has more than two factors

36 = 1, 2, 3, 4, 6, 9, 12, 18, 36

23 = 1, 23

When a whole number is expressed as the product of factors that are all prime numbers, the expression is called the prime factorization of the number.

$90 = 2 \cdot 3 \cdot 3 \cdot 5$
$= 2 \cdot 3^2 \cdot 5$

2 | 90
3 | 45
3 | 15
5

$84 = 2 \cdot 2 \cdot 3 \cdot 7$
$= 2^2 \cdot 3 \cdot 7$

2 | 84
2 | 42
3 | 21
7

$-140 = -1 \cdot 2 \cdot 2 \cdot 5 \cdot 7$
$= -1 \cdot 2^2 \cdot 5 \cdot 7$

2 | 140
2 | 70
5 | 35
7

A monomial is in factored form when it is expressed as the product of prime numbers and variables and no variable has an exponent greater than one.

$12a^2b^3$

$12 = 2 \cdot 2 \cdot 3$
$a^2 = a \cdot a$
$b^3 = b \cdot b \cdot b$

$2 \cdot 2 \cdot 3 \cdot a \cdot a \cdot b \cdot b \cdot b$

$-66pq^2$

$-66 = -1 \cdot 2 \cdot 3 \cdot 11$
$p = p$
$q^2 = q \cdot q$

$-1 \cdot 2 \cdot 3 \cdot 11 \cdot p \cdot q \cdot q$

Greatest Common Factor (GCF)

- The GCF of two or more integers is the product of the prime factors common to the integers.
- The GCF of two or more monomials is the product of their common factors when each monomial is in factored form.
- If two or more integers or monomials have a GCF of one, then the integers or monomials are said to be relatively prime.

Find the GCF of....

15 and 16

$15 = 3 \cdot 5$

$16 = 2 \cdot 2 \cdot 2 \cdot 2$

relatively prime

$36x^2y$ and $54xy^2z$

$36x^2y = 2 \cdot 2 \cdot 3 \cdot 3 \cdot x \cdot x \cdot y$

$54xy^2z = 2 \cdot 3 \cdot 3 \cdot 3 \cdot x \cdot y \cdot y \cdot z$

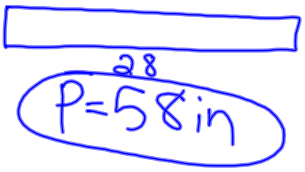
$18xy$

The area of a rectangle is 28 square inches. If the length and width are both whole numbers, what is the maximum perimeter of the rectangle?

$28 = 1, 2, 4, 7, 14, 28$

1×28

1

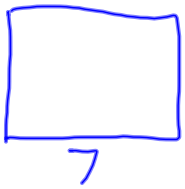


$P = 58$ in

2

$P = 32$ in

4



$P = 22$ in

Assignment

Pg. 478 #32-60 even; 62-64 all