

Course Readiness

Prerequisites and self-check for Intro to Number Theory 1

If you are comfortable with division and remainders, integer exponents, basic equations, algebraic expressions, and short multi-step problems like those below, then you are ready to begin **Intro to Number Theory 1**. Answers appear on the final page.

Division and remainders

1. Find the remainder in each division problem.

(a) $275 \div 12$

(b) $638 \div 25$

(c) $2025 \div 47$

Integer exponents

2. Evaluate each expression. Express your answer as an integer or as a fraction in lowest terms.

(a) $(-2)^5$

(b) $5^0 + 2^3$

(c) $\frac{3^4 \cdot 3^2}{3^3}$

(d) 2^{-3}

Equations

3. Solve each equation for x .

(a) $5x - 9 = 26$

(b) $4(x + 2) = 3x + 17$

(c) $\frac{x}{3} + 5 = 11$

(d) $x^2 - 7x + 12 = 0$

Algebraic expressions

4.

(a) Simplify $(4x - 3) + (7x + 5)$.

(b) Expand $(2n + 3)(n - 4)$.

(c) Factor $81 - 25x^2$.

(d) Factor $2y^2 + 7y + 3$.

Number sense

5.

- (a) Write 360 as a product of primes.
- (b) Among 37, 57, and 91, identify the prime number. Briefly justify your answer.
- (c) List all the positive divisors of 20.

Problem solving

6.

- (a) The list

$2, 5, 8, 11, 2, 5, 8, 11, \dots$

continues with the same repeating pattern. What is the 2026th number in the list?

- (b) When an integer n is divided by 10, the remainder is 7. What is the remainder when n is divided by 5?
- (c) Two positive integers differ by 7, and their sum is 41. Find the two integers.
- (d) Determine whether 4572 is divisible by 3 and whether it is divisible by 9. State the reason for each conclusion.

Answer Key

The answers below are intentionally brief. Course problem sets and class discussions will emphasize clear reasoning and complete solutions.

1. (a) 11 (b) 13 (c) 4
2. (a) -32 (b) 9 (c) 27 (d) $\frac{1}{8}$
3. (a) 7 (b) 9 (c) 18 (d) 3, 4
4. (a) $11x + 2$
(b) $2n^2 - 5n - 12$
(c) $(9 - 5x)(9 + 5x)$
(d) $(2y + 1)(y + 3)$
5. (a) $360 = 2^3 \cdot 3^2 \cdot 5$
(b) 37 is prime; $57 = 3 \cdot 19$ and $91 = 7 \cdot 13$
(c) 1, 2, 4, 5, 10, 20
6. (a) 5
(b) 2
(c) 17 and 24
(d) 4572 is divisible by both 3 and 9 because its digit sum is 18

What is not required before the course?

You do not need prior knowledge of divisor-counting formulas, the Euclidean Algorithm, linear Diophantine equations, or advanced divisibility techniques. These ideas are taught in the course.