Arithmetic

Exercise 1

Warm Up ●●●

Suppose a and b represent numbers. The symbol $\triangle a$, drawn in any size,
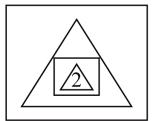
means $a + 4$. The symbol $\boxed{b}$, drawn in any size, means $-2b$. Find the value of

the figure below.

In AMC 8 ●●●

Consider these two operations:

$a \blacklozenge b = a^2 - b^2$

$a \ast b = (a - b)^2$

What is the value of $(5 \blacklozenge 3) \ast 6$? (2022 AMC 8 Problem, Question #2)

A. -20 B. 4 C. 16 D. 100 E. 220

If $A \blacklozenge B = (A + B)^2$ and $A \triangle B = A^2 + B^2$, then $(-2 \blacklozenge 3) \triangle 4 = $ _____ .

Exercise 2

Warm Up ●●●

In an office, it requires 360 square tiles with a side length of 0.2 meters to cover the floor. How many tiles will be needed to cover the floor with square tiles of a side length of 0.3 meters?

How many square yards of carpet are required to cover a rectangular floor that is 12 feet long and 9 feet wide? (There are 3 feet in a yard)

(2015 AMC 8 Problems, Question #1)
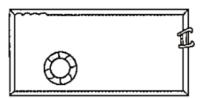
A. 12   B. 36   C. 108   D. 324   E. 972

Exit Ticket ●●●

In the diagram is a swimming pool with a length of 50 meters. It's known that 8 such swimming pools cover exactly 1 hectare of land. What is the width of this swimming pool in meters? (1 hectare $= 10000$ square meter)

Exercise 3

Calculate: $1 - 2 + 3 - 4 + 5 - 6 + \cdots + 2019 - 2020 = $ _____ .

What is the value of $4 \cdot (-1 + 2 - 3 + 4 - 5 + 6 - 7 + \cdots + 1000)$? (2013 AMC 8 Problem, Question #3)

A. -10 B. 0   C. 1   D. 500   E. 2000

Exit Ticket ●●○

Calculate: $111 - 112 + 113 - 114 + 115 - 116 + \cdots + 2019 - 2020 = $ _____ .

Exercise 4

Warm Up ●●○

Calculate:
$1 + 2 - 3 - 4 + 5 + 6 - 7 - 8 + \cdots + 2017 + 2018 - 2019 - 2020 + 2021 + 2022 - 2023 = $ _____ .

A. 0   B. -1 C. 2023   D. -2023

What is the value of $1 + 3 + 5 + \cdots + 2017 + 2019 - 2 - 4 - 6 - \cdots - 2016 - 2018$? (2018 AMC 8 Problem, Question #5)

A. -1010 B. -1009 C. 1008 D. 1009 E. 1010

Exit Ticket ●●●

Given $A = a + a^2 + a^3 + a^4 + \cdots + a^{2019}$, and $a = -1$, $A =$ _____ .

Exercise 5

Eddie lives on the first floor, while Vicky lives on the tenth floor. Eddie wants to visit Vicky's place. How many flights of stairs does Eddie need to climb from the first floor to the tenth floor?

A. 8   B. 9   C. 10   D. 11

The first AMC 8 was given in 1985 and it has been given annually since that time. Samantha turned 12 years old the year that she took the seventh AMC 8. In what year was Samantha born? (2014 AMC 8 Problem, Question #10)

A. 1979   B. 1980   C. 1981   D. 1982   E. 1983

Cutting a piece of wood into 7 segments takes 12 minutes. It takes (　) minutes to cut it into 4 segments.

A. 6　　　　　　　　B. 7　　　　　　　　C. 8　　　　　　　　D. 9

Exercise 6

Find the greatest prime factor of $2^{13} + 2^{11} - 10$.

What is the largest power of 2 that is a divisor of $13^4 - 11^4$? (2016 AMC 8 Problem, Question #15)

A. 8 B. 16 C. 32 D. 64 E. 128

Exit Ticket ●●○

If n is a positive integer, and $2^4 + 2^7 + 2^n$ is the perfect square, find the value of n.