TESTING NUMBER CONJECTURES

STEPS TO SUCCESS

1. Step 1: Understand the conjecture and identify the variables
2. Step 2: Test with specific examples to check validity
3. Step 3: Formulate a general proof or counterexample
4. Step 4: Apply to more complex algebraic and numerical statements

MAIN QUESTIONS

QUESTION 1

Doubling an integer then adding 1 always gives an odd number

Final answer:

QUESTION 2

The sum of two consecutive integers is always odd

Final answer:

QUESTION 3

The product of two even numbers is always even

Final answer:

QUESTION 4

The square of an odd number is always odd

Final answer:

QUESTION 5

The sum of three consecutive integers is always divisible by 3

Final answer:

QUESTION 6

The difference between two odd numbers is always even

Final answer:

QUESTION 7

The sum of two prime numbers is always even

Final answer:

QUESTION 8

The product of two consecutive integers is always even

Final answer:

QUESTION 9

The cube of an even number is always even

Final answer:

QUESTION 10

The sum of the squares of two consecutive integers is always odd

Final answer:

QUESTION 11

The difference of squares of two consecutive integers is always odd

Final answer:

QUESTION 12

The sum of any five consecutive integers is always divisible by 5

Final answer:

QUESTION 13

The product of three consecutive integers is always divisible by 6

Final answer:

QUESTION 14

The square of any integer ending in 5 always ends in 25

Final answer:

QUESTION 15

The sum of two multiples of 3 is always a multiple of 3

Final answer:

QUESTION 16

The difference of two multiples of 4 is always a multiple of 4

Final answer:

QUESTION 17

The product of an even and an odd number is always even

Final answer:

QUESTION 18

The sum of an even and an odd number is always odd

Final answer:

QUESTION 19

The cube of an odd number is always odd

Final answer:

QUESTION 20

The sum of four consecutive integers is always even

Final answer:

QUESTION 21

The product of four consecutive integers is always divisible by 24

Final answer:

QUESTION 22

The square of any integer is either divisible by 4 or leaves remainder 1 when divided by 4

Final answer:

QUESTION 23

The sum of the cubes of three consecutive integers is always divisible by 9

Final answer:

QUESTION 24

The product of two numbers differing by 2 is always one less than a square

Final answer:

QUESTION 25

The sum of the first n odd numbers is always n^2

Final answer:

QUESTION 26

The difference between the squares of two consecutive even numbers is always divisible by 4

Final answer:

QUESTION 27

The product of two numbers that sum to 10 is always less than or equal to 25

Final answer:

QUESTION 28

The sum of the digits of any multiple of 9 is always a multiple of 9

Final answer:

QUESTION 29

The cube of any integer is either divisible by 9 or leaves remainder ± 1 when divided by 9

Final answer:

QUESTION 30

The product of three consecutive odd numbers is always odd

Final answer:

QUESTION 31

The sum of the squares of three consecutive integers is never divisible by 3

Final answer:

QUESTION 32

The difference between the cube of a number and the number itself is always divisible by 6

Final answer:

QUESTION 33

The sum of the first n natural numbers is always n(n + 1)/2

Final answer:

QUESTION 34

The product of two numbers that differ by 4 is always 16 less than the square of their average

Final answer:

QUESTION 35

The sum of the reciprocals of two consecutive integers is always a fraction in simplest form

Final answer: