Consider the following pattern:

1 + 2 + 3 + 4 + 5 = **15**

(-15) + (-14) + (-13) + (-12) + (-11) = **-65**

(-3) + (-2) + (-1) + 0 + 1 = **-5**

What conjecture can you make from these three examples?

When you add up 5 consecutive integers... what do we get?

Try some of your own examples:
(remember, variety is good)

170 + 171 + 172 + 173 + 174 = **860**

25 + 26 + 27 + 28 + 29 = **135**

What conjecture can you make from these three examples?

When you add up 5 consecutive integers... what do we get? **A multiple of 5**

This is your conjecture! How do you know for sure it is always true so that you can generalize "EVERY time you add 5 consecutive integers, you get a multiple of 5"

We have provided 5 examples and we may feel fairly confident that our conjecture is always true

BUT remember that inductive reasoning (support by evidence and examples) cannot prove a conjecture

We can actually PROVE our conjecture by **deductive reasoning**

We have provided 5 examples and we may feel fairly confident that our conjecture is always true

BUT remember that inductive reasoning (support by evidence and examples) cannot prove a conjecture

We can actually PROVE our conjecture by **deductive reasoning**

A mathematical proof using deductive reasoning is based on claims and assumptions that are verified to be always TRUE along the way

Proof for: The sum of 5 consecutive integers is a multiple of 5

Proof for: The sum of 5 consecutive integers is a multiple of 5

1. Let x represent the median of the 5 numbers

2. We can rewrite the LEFT side to be and set it to S:

$$(x-2) + (x-1) + x + (x+1) + (x+2) = S$$

3. We simplify the equation:

$$x - 2 + x - 1 + x + x + 1 + x + 2 = S$$
$$5x - 2 - 1 + 1 + 2 = S$$
$$5x = S$$

We have determined that the sum S is 5 times the median so Therefore, the sum S is a multiple of 5.

Organizing proofs using the TWO Column method

Conjecture: When two straight lines intersect, the opposite angles are equal to each other.

Claim	Justification
1. AEB + AEC = 180°	supplementary angles
2. AEB = 180° – AEC	algebraic subtraction
3. CED + AEC = 180°	supplementary angles
4. CED = 180° – AEC	algebraic subtraction
AEB = CED	transitive property (if A=B and C=B then A=C)