

11. What can you say about the sum of two even integers? Inductive Reasoning for a Conjecture.
Deductive Reasoning to prove the Conjecture.

Pattern: $2+4=6$ $50+8=58$ Based on the pattern,
 $10+12=22$ etc. our Conjecture is
that the sum of two
even integers is even.

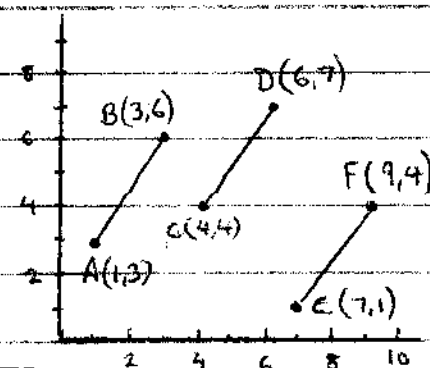
Proof: $2m$ represents first even integer.] *
 $2n$ represents second even integer.]
* We know each of these is even because
 $2 \times$ any integer is an even integer.

$$\begin{aligned}\text{Sum} &= 2m + 2n \\ &= 2(m+n)\end{aligned}$$

Whatever the sum of $m+n$,
the result is multiplied by 2.
Thus an even integer.

14. ALGEBRA:

- a. Use Distance Formula to show that the three segments are congruent.



$$AB: \sqrt{(3-1)^2 + (6-3)^2} = \sqrt{(2)^2 + (3)^2} = \sqrt{4+9} = \sqrt{13}$$

$$CD: \sqrt{(6-4)^2 + (7-4)^2} = \sqrt{(2)^2 + (3)^2} = \sqrt{4+9} = \sqrt{13}$$

$$EF: \sqrt{(9-7)^2 + (4-1)^2} = \sqrt{(2)^2 + (3)^2} = \sqrt{4+9} = \sqrt{13}$$

- b. Make a conjecture about segments in this coordinate plane that are congruent to the given segments.

Test your conjecture.

If an endpoint is three units above, and two units right of the other endpoint, the segments are congruent.

Test: $(5, 3)$ is three above and two right of $(3, 0)$

$$XY = \sqrt{(5-3)^2 + (3-0)^2} = \sqrt{(2)^2 + (3)^2} = \sqrt{4+9} = \sqrt{13}$$

- c. Let one point be (x, y) . Use conjecture to determine second end-point and prove the segments congruence.

1st Point: (x, y)

2nd Point: $(x+2, y+3)$

$$\begin{aligned} \text{Dist} &= \sqrt{[(x+2)-x]^2 + [(y+3)-y]^2} \\ &= \sqrt{[2]^2 + [3]^2} = \sqrt{4+9} = \sqrt{13} \end{aligned}$$

* Other conjectures??

23. What can you say about the sum of an even and an odd integer? Inductive Reasoning for a Conjecture.
Deductive Reasoning to prove the Conjecture.

Pattern:	$2 + 1 = 3$	}	Based on the pattern, our Conjecture is that the sum of an even and odd integer is ODD.
	$50 + 51 = 101$		
	$10 + 7 = 17$		
	$4 + 5 = 9$		

Proof: $2m$ represents an even integer.
 $2n+1$ represents an odd integer.

$$\begin{aligned}\text{Sum} &= 2m + 2n + 1 \\ &= 2(m+n) + 1\end{aligned}$$

The term $2(m+n)$ is even.

Adding 1 to an even integer will result in an odd integer.

Thus an even and odd integer will always sum to an odd integer.