# Quiz 1

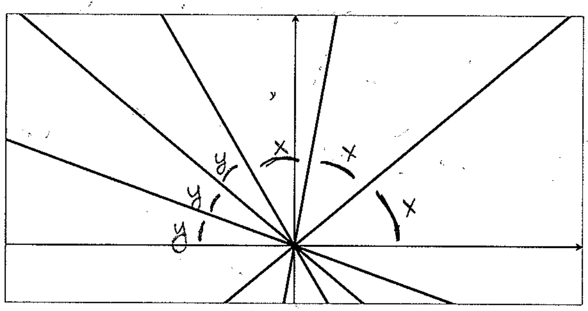
Part A: [1] True/False. No partial credit is given.

T F The symbols $\overline{AB}$ and $\overline{BA}$ determine the same geometric figure.

T F All two points are collinear.

Part B: Show *all* your work on the following. A right answer with no supporting work will receive no credit.

1. [2] Find the measure of $x + y$ provided:




note

$x+x+x+y+y+y = 180$

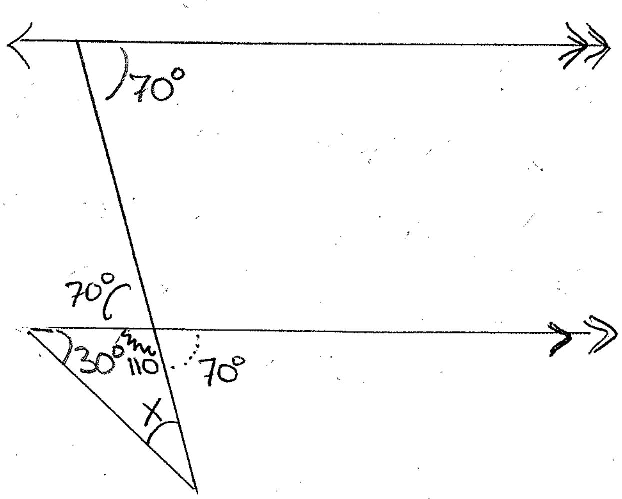
$3x + 3y = 180$

$3(x+y) = 180$

$x+y = 60$

2. [2] Find the measure of $x$ provided:

Assume lines a & b are parallel!?




by AIA

by vertical property

& by supplimental angles.

Since

$30 + 110 + x = 180$

$140 + x = 180$

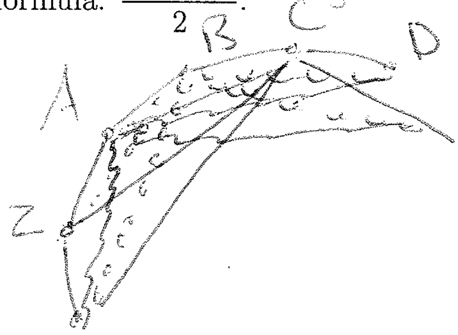
$x = 40$

note: if say 'this can't be determined' credit will still be given

3. [5] *Justify* the following fact to a 5th grader:

Another way: Count the # of diagonals emanating from A (n-3), B (n-3)... and in fact all points on the n-gon have (n-3) diag emanating from them. The total # of diag counted each diag twice though.

The number of diagonals in an $n$-gon is given by the formula: $\dfrac{(n-3)n}{2}$.




Consider the first pt, call it A. Note we can't form a diagonal from A to A or from A to B or from A to Z because the points are too 'close'. However, we can form diagonals with C, D, E... indeed the remaining n-3 points.

The second pt, B has a similar situation, A, B & C are too 'close' to it to form a diagonal. But it can form diagonals with the remaining n-3 points.

The third pt C has a similar beginning B, C & D are too 'close' but in addition to that we've already counted the diagonal $\overline{AC}$. The points A, B, C & D can't be used to define new diagonals, but the remaining n-4 points can.

The fourth pt D is much like C. C, D & E are too 'close'. Additionally we don't want to recount the diagonal with A & B. Thus A, B, C, D & E can't be used to define new diagonals, but the remaining n-5 can.

The pattern continues and if we sum up all the diagonals we find

$$(n-3) + \underbrace{(n-3) + (n-4) + (n-5) + \dots + 2 + 1}$$

$$= n-3 + \frac{(n-3)(n-2)}{2} = \frac{2(n-3) + (n-3)(n-2)}{2}$$

$$= \frac{(n-3)(2+n-2)}{2} = \frac{(n-3)n}{2}$$