Quick way to determine point colinearity

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Given: Points A, B, C on a line.

Question: is point C between points A and B?

-------A ------------------------- C -------------------- B -------

Let A=(xa,ya), B=(xb,yb), C=(xc, yc)

Technique 1:

   Determine if dist(A,C) + dist(C,B) = dist(A,B)

   where dist (P,Q) = SQRT((xp-xq)^2 + (yp-yq)^2)

Technique 2:

The direction vector between two points P and Q is:

   Dir(P,Q) = (qx-px, qy-py)

Then find:
   Dir(A,C) and Dir(C,B)

The sign of the X and Y components of these direction vectors should be the same. Note that if the line is horizontal, then the Y component is zero for both directions, and you look at the X direction sign.

<u>EXAMPLE</u>:   Let A = (1,1), B = (5,5), C=(2,2).

a) Is C between A and B?
   Dir(A,C) = (1,1)
   Dir(C,B) = (3, 3).
   --> Same sign for X and Y, therefore C between A and B,

b) is B between A and C?
   Dir(A,B) = (4,4)
   Dir(B, C) = (-3, -3)

the sign changes in X (and Y), thus B is not between A and C.