

(a) First we find the distances between points:

$$|AB| = \sqrt{(3-2)^2 + (5-3)^2 + (-3-1)^2} = \sqrt{21}$$

$$|BC| = \sqrt{(1-3)^2 + (2-5)^2 + (3-(-3))^2} = \sqrt{49} = 7$$

$$|AC| = \sqrt{(1-2)^2 + (2-3)^2 + (3-1)^2} = \sqrt{6}$$

In order for the points to lie on a straight line, the sum of the two shortest distances must be equal to the longest distance. Since $|AB| + |AC| \neq |BC|$, the three points **do not** lie on a straight line.

(b) First we find the distances between points:

$$|DE| = \sqrt{(1-0)^2 + (0-(-4))^2 + (3-4)^2} = \sqrt{18} = 3\sqrt{2}$$

$$|EF| = \sqrt{(3-1)^2 + (4-0)^2 + (2-3)^2} = \sqrt{21}$$

$$|DF| = \sqrt{(3-0)^2 + (4-(-4))^2 + (2-4)^2} = \sqrt{77}$$

Since $|DE| + |EF| \neq |DF|$, the three points **do not** lie on a straight line.