1-1.6.16

AI24BTECH11011 - Himani Gourishetty

1) Find the values of k if the points $\mathbf{A}\,(k+1, 2k)$, $\mathbf{B}\,(3k, 2k+3)$, $\mathbf{C}\,(5k-1, 5k)$ are collinear.
Solution Given,

Variable	Description	formula
$\mathbf{A}\,(x1, y1)$	$(k+1, 2k)$	-
$\mathbf{B}\,(x2, y2)$	$(3k, 2k+3)$	-
$\mathbf{C}\,(x3, y3)$	$(5k-1, 5k)$	-
Area	Area formed by the 3 points	$x1\,(y2-y3) + x2\,(y3-y1) + x3\,(y1-y2)$

for these points to be collinear , the area should be zero;

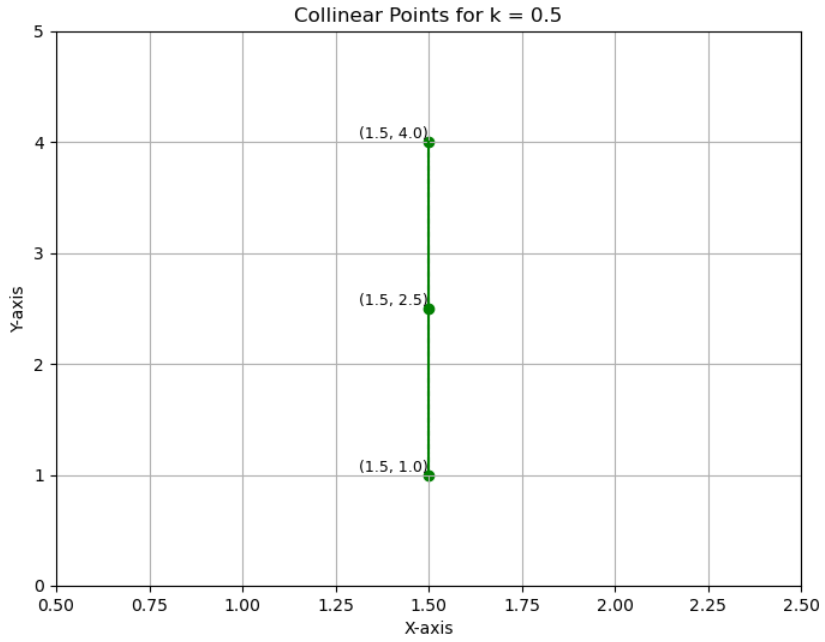
$$Area = x1(y2-y3) + x2(y3-y1) + x3(y1-y2) \tag{1}$$

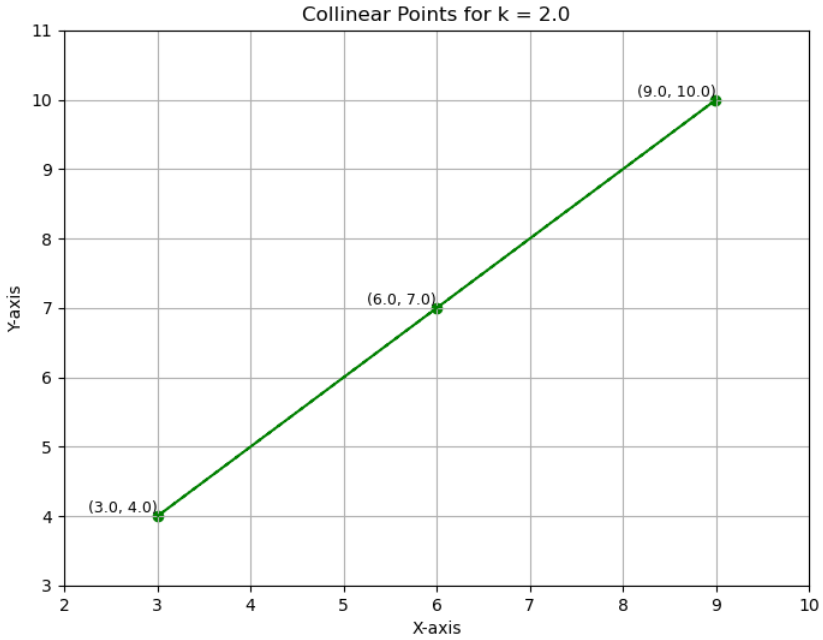
$$0 = (k+1)\,(-3k+3) + (3k)\,(3k) + (5k-1)\,(-3) \tag{2}$$

$$0 = 6k^2 - 15k + 60 = (6k-3)\,(k-2) \tag{3}$$

then,

$$k = 2; k = 0.5 \tag{4}$$




Collinear Points for k = 2.0
(9.0, 10.0)
(6.0, 7.0)
(3.0, 4.0)
Y-axis
X-axis
11
10
9
8
7
6
5
4
3
2
3
4
5
6
7
8
9
10