Answer on Question #57672- Math - Geometry

Problem: Two sides of a square lie along the lines 4x + 3y = 15 and 4x + 3y = 5. Find the area of the square.

Solution: Let us find distance between lines. Point (1, 1) belongs to the second line, so distance between lines is equal to distance between first line and point (1, 1):

$$a = \frac{|4 * 1 + 3 * 1 - 15|}{\sqrt{3^2 + 4^2}} = \frac{10}{5} = 2$$

Moreover, this distance is equal to side of the square. Area of the square is equal to $a^2=2^2=4$.

Problem: Two sides of a square lie along the lines 8x - 6y = 48 and 4x - 3y = 12. Find the perimeter of the line square.

Solution: Let us find distance between lines. Point (3, 0) belongs to the second line, so distance between lines is equal to distance between first line and point (3, 0):

$$a = \frac{|8 * 3 - 6 * 0 - 48|}{\sqrt{8^2 + 6^2}} = \frac{24}{10} = 2.4$$

Moreover, this distance is equal to side of the square. Perimeter of the line square is equal to 4a=4*2.4=9.6

Problem: Find the directed distance from the line to the point: a. x = y = 5; (-2, -1)

Solution: Actually, x = y = 5 is not a line, it is the point (5,5). Distance between points (5, 5) and (-2, -1):

$$d = \sqrt{(-2 - 5)^2 + (-1 - 5)^2} = \sqrt{85}$$

Problem: Find the directed distance from the line to the point: b. x = 4y x = 4y; (3, 1)

Solution: lets write this equality in another form: x-4y=0. Distance:

$$a = \frac{|1 * 3 - 4 * 1|}{\sqrt{1^2 + (-4)^2}} = \frac{1}{\sqrt{17}}$$

Problem: Find the directed distance from the line to the point: c. 12x + 5y + 56 = 0; (-2, 4)

Solution: Distance:

$$a = \frac{|12 * (-2) + 5 * 4 + 56|}{\sqrt{12^2 + 5^2}} = \frac{52}{13} = 4$$

Problem: Find the directed distance from the line to the point: a. 2x - 3y - 12 = 0; (-1, 2)

Solution: Distance:

$$a = \frac{|2 * (-1) - 3 * 2 - 12|}{\sqrt{2^2 + (-3)^2}} = -\frac{20}{\sqrt{13}}$$

Problem: Find the directed distance from the line to the point: 5x + 12y + 56 = 0; (-2, 4)

Solution: Distance:

$$a = \frac{|5 * (-2) + 12 * 4 + 56|}{\sqrt{5^2 + 12^2}} = \frac{94}{13}$$