TRANSPORTA UN SAKARU INSTITUTS

EXERCISES OF

HIGHER MATHEMATICS I

LINE

1. Find the equation of the line that passes the points

   a) $(3,2)$ and $(-1,-5)$ *b)* $(-1,3)$ and $(2,-5)$ *c)* $(0,\pi)$ and $\left(\frac{\pi}{2},0\right)$

   d) $\left(-\frac{3}{5},\frac{1}{2}\right)$ and $\left(2,\frac{1}{4}\right)$ *e)* $\left(\frac{2}{3},-3\right)$ and $\left(5,\frac{1}{7}\right)$ *f)* $(2,\sqrt{3})$ and $(2,\sqrt{5})$

   Find the interceptions. Make the graph.

2. Represent the above lines in its polar representation.

3. Consider the line $y = 2x - 4$. Find the points (x, y) such that $x \in [-3, 3]$ $x \in \mathbb{Z}$. What is the polar representation (r, θ) to each point?

4. Find the slope to the next lines

   a) $r = \dfrac{1}{\frac{\cos\theta}{4} + \frac{\sin\theta}{5}}$ *b)* $r = \dfrac{1}{\frac{\cos\theta}{2} - \frac{\sin\theta}{5}}$

   c) $r = \dfrac{1}{\cos\theta - \sin\theta}$ *d)* $\frac{r}{3} = \dfrac{1}{\cos\theta + \sin\theta}$

5. Find the perpendicular line y_2 to the line

   a) that crosses the points $(-2,5)$ and $(4,1)$ if y_2 is crossing $(\frac{2}{3},\frac{5}{2})$

   b) $y_1 = \pi x - 4$ if y_2 is crossing the origin.

   c) $\dfrac{r}{2} = \dfrac{1}{\cos\theta - \sin\theta}$ if y_2 is crossing the point $(-1,7)$

6. Find the angle between the lines

   a) $y = 4x - 2$ and $y = 5x + 2$

   b) $y = 4 - x$ and $r = \dfrac{1}{\frac{\cos\theta}{4} - \sin\theta}$

7. Find the line $y_2 = mx + b$ that intercept the line y_1 at the point a with an angle θ if

   a) $y_1 = -2x + 5$ $\quad a = (0,5)$ $\quad \theta = \dfrac{\pi}{2}$.

   b) y_1 crosses the point $a = (-2,-3)$ and $b = (4,5)$ $\quad \theta = \dfrac{\pi}{4}$.

   c) y_1 is the line $r = \dfrac{1}{\frac{\cos\theta}{2} + \frac{\sin\theta}{5}}$, a lies on the $x-$axe and $\theta = \dfrac{\pi}{3}$.

8. Find the distance between the line and the point a if

$a)$ $4x + 3y + 4 = 0 \qquad a = (-3, 1)$

$b)$ $y = -4x + 2 \qquad a = (2, -5)$

$c)$ $3x + y = 5 \qquad a = (1, 8)$