

A point (x, y)

$$a) m = \frac{\Delta y}{\Delta x} = \frac{y - (-2)}{x - 0} = \frac{y + 2}{x} = 1 \quad y = x + 0 \rightarrow y = -14 + 10 = b = 18$$

$$\Rightarrow y = x + 11$$

$$b) y + 4x = b \quad | \frac{1}{4} \Rightarrow x + y = b = 18 \Rightarrow y + 4x = 18$$

$$c) x + 3x = 1 \Rightarrow -3x + y = b \quad | \frac{1}{4} \Rightarrow -12 + y = b = -10 \Rightarrow -3x + y = -10$$

$$d) m = \tan \frac{\pi}{4} = \sqrt{2} \quad y = \sqrt{2}x + b \Rightarrow x = \sqrt{2}(x + b) \Rightarrow b = x - \sqrt{2}x \Rightarrow y = \sqrt{2}x + x - \sqrt{2}x$$

$$e) \sqrt{(x-2)^2 + (y-3)^2} = \sqrt{9+16} = \sqrt{25} = 5$$

$$b) x^2 + y^2 = r^2 \Rightarrow \frac{|ax+by+c|}{\sqrt{a^2+b^2}} = \frac{|9+12-3|}{\sqrt{9+16}} = \frac{18}{5} = r$$

$$a) \begin{cases} x^2 + y^2 = 5 \\ x^2 + y^2 = 4 \end{cases} \Rightarrow \begin{cases} x^2 + y^2 = \frac{5+4}{2} \Rightarrow x^2 + y^2 = 4.5 \end{cases}$$

$$b) \begin{cases} x^2 + y^2 = 5 \\ x^2 + y^2 = 4 \end{cases} \Rightarrow \frac{|9-5|}{\sqrt{5+5}} = \frac{r}{\sqrt{10}} = \frac{\sqrt{10}}{10}$$

$$\frac{|x^2 - y^2 - 1|}{\sqrt{x^2 + y^2}} = \frac{|x^2 + y^2 - 3|}{\sqrt{x^2 + y^2}} \Rightarrow |x^2 - y^2 - 1| = |x^2 + y^2 - 3|$$

$x^2 - y^2 - 1 = x^2 + y^2 - 3 \Rightarrow 2y^2 = 2 \Rightarrow y = \pm 1$
 $x^2 - y^2 - 1 = -x^2 - y^2 + 3 \Rightarrow 2x^2 = 4 \Rightarrow x = \pm 2$

$$y = x + 2 \quad \tan \alpha = \left| \frac{m - m'}{1 + mm'} \right| = \left| \frac{1 - (-2)}{1 - 2} \right| = 1 \Rightarrow \alpha = 45^\circ$$

$$y = -x + 3$$

$$AB = \sqrt{(\Delta x)^2 + (\Delta y)^2} = \sqrt{4^2 + 4^2} = 10$$

$$c) M \begin{vmatrix} \frac{2A+B}{2} = \frac{5-1}{2} = 2 \\ \frac{3A+B}{2} = \frac{5-2}{2} = 1.5 \end{vmatrix} \Rightarrow M \begin{vmatrix} -1 \\ 1 \end{vmatrix}$$

$$M \begin{vmatrix} \frac{2A+B+C}{3} = \frac{-10+2+3}{3} = -2 \\ \frac{3A+B+C}{3} = \frac{-12+2+3}{3} = -3 \end{vmatrix} \Rightarrow M \begin{vmatrix} -2 \\ -3 \end{vmatrix}$$

$$b) \frac{1}{r} \begin{vmatrix} r & 1 \\ -r & r \\ -10 & -13 \end{vmatrix} = \frac{1}{r} |4 + (-10) + r^2 - (-30) - (-r) - (-r)| = \frac{1}{r} r^2 \in \mathbb{R}$$

$$الف) -y = \frac{rx+1}{x-r} \Rightarrow y = \frac{rx+1}{r-x} \quad y \rightarrow -y$$

$$ب) y = \frac{-rx+1}{-x-r} = \frac{rx-1}{x+r} \quad x \rightarrow -x$$

$$ج) x = \frac{ry+1}{r-y} \Rightarrow y = \frac{rx+1}{x-r} \quad x \rightarrow ry, y \rightarrow x$$

$$د) -x = \frac{-ry+1}{-x-y} \Rightarrow x = \frac{-ry+1}{x+y} \Rightarrow y = \frac{-rx+1}{x+r} \quad x \rightarrow -y, y \rightarrow -x$$

$$الف) y' - r = \frac{rx' + 1}{x' + r} \Rightarrow y' = \frac{rx' + 1}{x' - 1} \quad x' = x - r \Rightarrow x = x' + r$$

$$\Rightarrow y' = \frac{r(x' + r) + 1}{x' - 1} \Rightarrow y' = \frac{rx' + r^2 + 1}{x' - 1}$$

$$ب) y' + r = \frac{rx' + 1}{x' + r} \Rightarrow y' = \frac{rx' + 1}{x'}$$

$$x' = x - r \Rightarrow x = x' + r$$

$$y' = y - r \Rightarrow y = y' + r$$

$$y' = \frac{rx' + 1}{x'} - r \Rightarrow \frac{1}{x'}$$

$$الف) \begin{cases} rx + ry = 1 \\ x - ry = 1 \end{cases} \Rightarrow \begin{cases} rx + ry = 1 \\ rx - 10y = r \end{cases} \Rightarrow 19y = -1 \Rightarrow y = -\frac{1}{19} \Rightarrow x = \frac{19}{19}$$

$$ب) \begin{cases} rx + ry = 1 \\ x - 5y = 1 \end{cases} \Rightarrow \begin{cases} rx + ry = 1 \\ -10 - 5 = -19 \end{cases} \Rightarrow \frac{19}{-19} = -1 \Rightarrow y = \frac{r-r}{-10-r} = \frac{1}{19}$$