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DEPARTMENT: Pre-medicine and Surgery

COLLEGE: Medicine and Health Sciences

LEVEL: 100

ASSIGNMENT

1. $y-3x-2=0…(equation 1)$

 $y=3x-2$

 Compare with y = m1 + c

 m1= 3

 $3y+x+9=0…(equation 2)$

 $y=\left(-\frac{1}{3}\right)x-3$

 Compare with y = m₁ + c

 m₂= -⅓

 For perpendicular lines; m₁.m₂= -1

 So, $3×\left(-\frac{1}{3}\right)=-1$

 Therefore; the equations y - 3x -2 = 0 and 3y + x + 9 = 0 are perpendicular to each other.

1. $3y-4=2x+3…(equation 1)$

 $y=\left(\frac{2}{3}\right)x+\frac{7}{3}$

 Compare with y = m₁ + c

$ $ $m₁=\frac{2}{3}$

 $y-5=x+6…(equation 2)$

 $y=x+11$

 Compare with y = m₂ + c

 m₂= 1

 For perpendicular lines; m₁.m₂ = -1

 So, $\frac{2}{3}×1=\frac{2}{3}$

 Therefore, the equation $3y-4=2x+3$ and$ y-5=x+6$ are not perpendicular because their gradient product is not equal to -1.

1. $x^{2}+y^{2}+3xy-11=0 at point x=1,y=2 $

 $2x+2y+3\left[x×\frac{dy}{dx}+y×1\right]=0$

 $2x+2y(\frac{dy}{dx})+3x(\frac{dy}{dx})+3y=0$

 $2y\left(\frac{dy}{dx}\right)+3x\left(\frac{dy}{dx}\right)=-2x-3y$

 $\frac{dy}{dx}\left(2y+3x\right)=-2x-3y$

 $\frac{dy}{dx}=\frac{-2x-3y}{2y+3x}$

 $m₁=\frac{dy}{dx}=\frac{\left[-2\left(1\right)+3\left(2\right)\right]}{\left[2\left(2\right)+3\left(1\right)\right]}=\frac{-2-6}{4+3}=\frac{-8}{7}$

 $y-y₁=m₁(x-x₁)$

 $y-2=\frac{-8}{7}(x-1)$

 $7y-14=-8x+8$

 $7y+8x-22=0$

 The equation of the tangent of $x² +y²+3xy-11=0$ is $7y+8x-22=0$.

 m₁.m₂=-1

 $m₂=\frac{-1}{\frac{8}{7}}=\frac{7}{8}$

 $y-y₁=m₂(x-x₁)$

 $y-2=(\frac{7}{8})(x-1)$

 $8y-16=7x-7$

 $8y-7x-9=0$

 The equation of the normal is $8y-7x-9=0$.