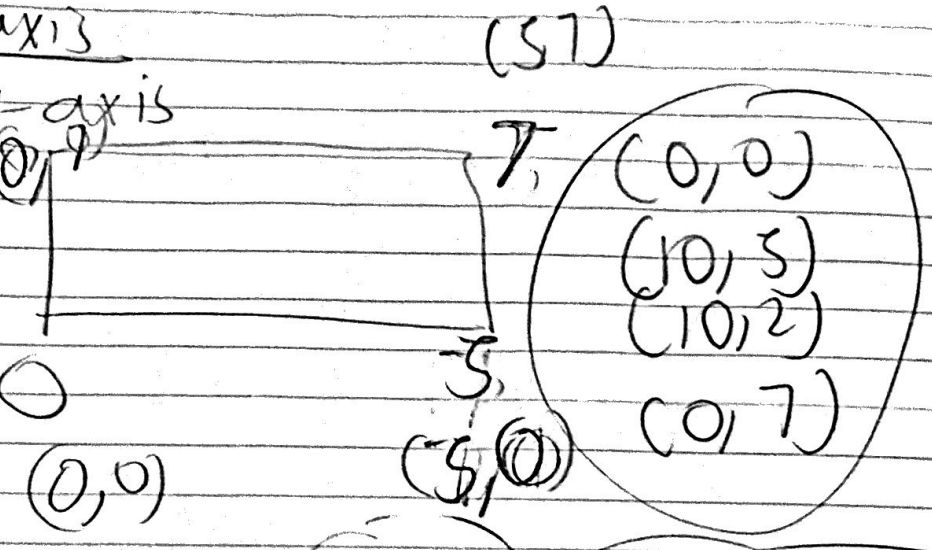
Fayed Raza 11/8/2020

15.6: 1, 3, 13, 15, 17, 19, 23

1.

a. $y = \frac{1}{2}x$



b.

c. $G(1,2) = (2,3)$

$G(5,3) = (10,8)$

Segment joining (2,3) and (10,8)

d. $G(0,1) = (0,1)$

$G(1,0) = (2,1)$

$G(1,1) = (2,2)$

3. G is not one to one

$1^2 = 1$ $\quad 1 \to 1$

$-1^2 = 1$ $\quad -1 \to 1$

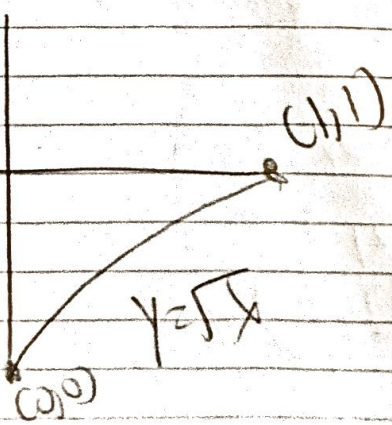
$[(u,u) : u \geq 0]$ makes G one to one

a) positive x-axis in respect to y axis

b) Rectangle $[0,1] \times [-1,1]$

c) The curve $y = \sqrt{x}$ for $0 \leq x \leq 1$

d)



13 $\begin{vmatrix} 3 & 4 \\ 1 & -2 \end{vmatrix}$

$-6 - 4 = \boxed{-10}$

15 $\begin{vmatrix} \sin t & r\cos t \\ 1 - \cos t & r\sin t \end{vmatrix}$

$(\sin\pi, 1-\cos\pi)$

$(0, 2)$

$(1, \pi)$

$(-1, 0)$

$\sin^2 t + r\cos t$

$\sin^2\pi - \cos(\pi)$

$0 - (-1) = \boxed{1}$

17 $\begin{vmatrix} \cos\theta & -r\sin\theta \\ \sin\theta & r\cos\theta \end{vmatrix}$

$r\cos^2\theta + r\sin^2\theta$

$r(\cos^2\theta + \sin^2\theta) = r$

(4)

p1 $u\ 2\ 3\ v$

$+1$

$T(u,v) = (4u+2v, u+3v)$

2) $\begin{vmatrix} 3 & 2 \\ 1 & 2 \end{vmatrix}$

a) area

$3 \times 5 = 15 - 1 = 7 \times 15 =$ (105)

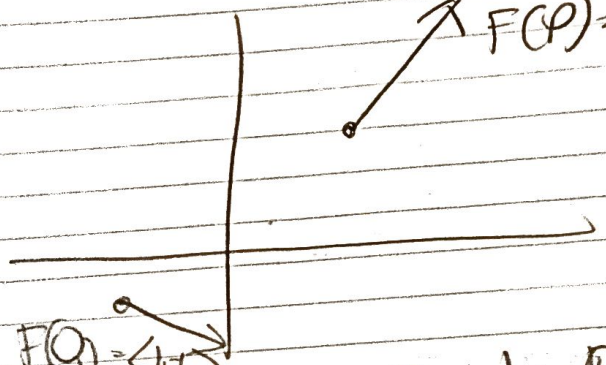
b) $3 \times 6 = 18$ $7 \times 18 =$ (126)

$\begin{array}{r} 18 \\ \times\ 7 \\ \hline 126 \end{array}$

16.1: 1, 3, 5, 7, 9, 11, 17, 23, 25, 27

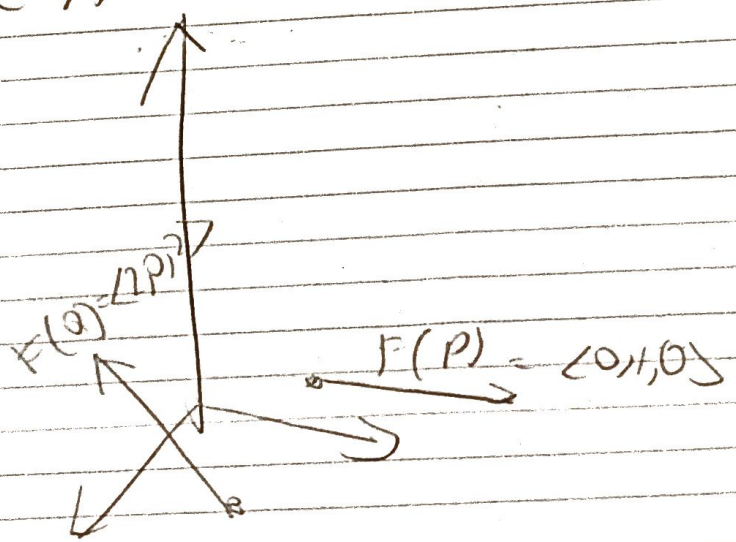
1. $F(1,2) = \langle 1, 1 \rangle$

$F(-1,-1) = (1,-1)$

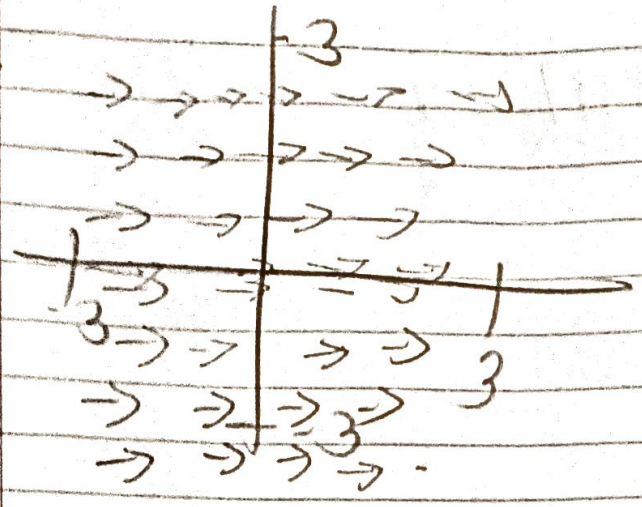


3. $F(0,1,1) = \langle 0, 1, 0 \rangle$

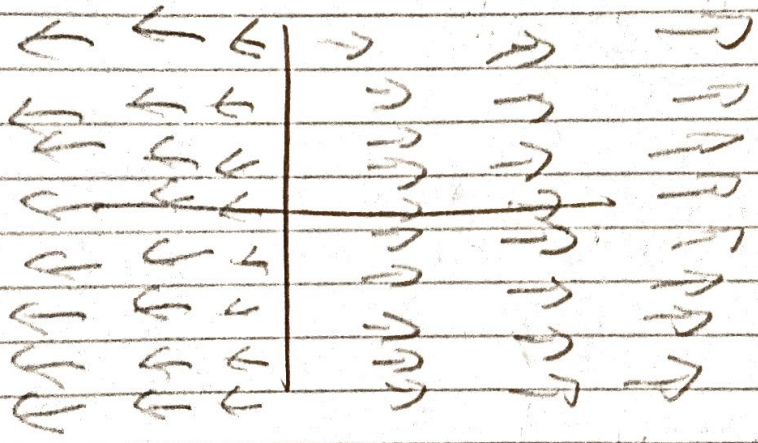
$F(2,1,0) = \langle 2, 0, 2 \rangle$



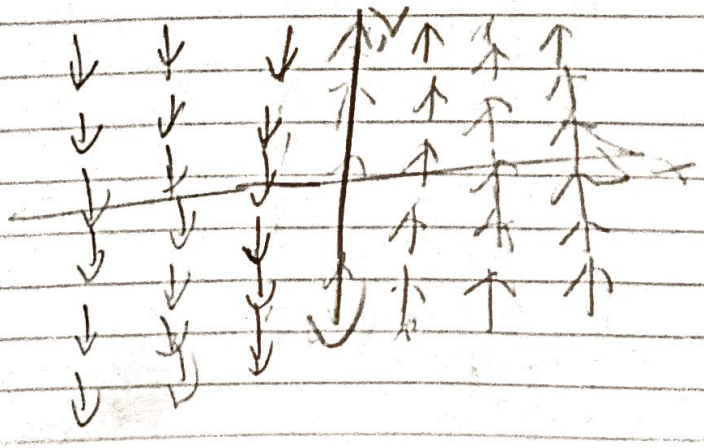
5



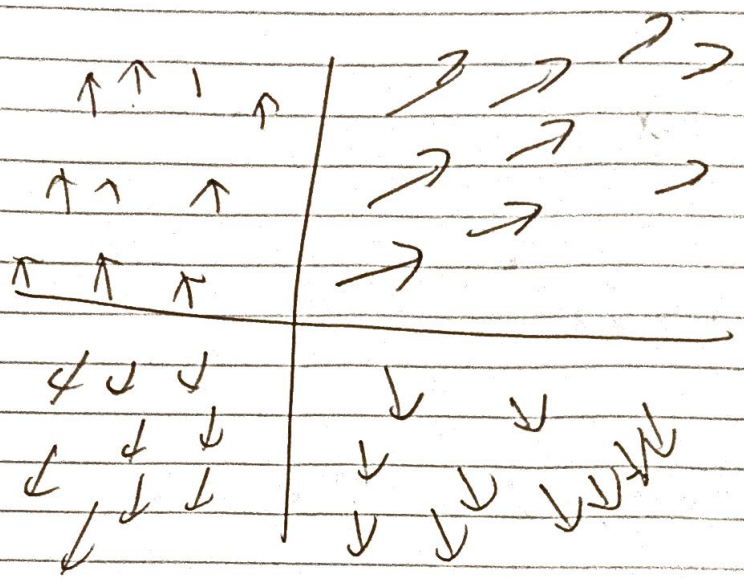
7. $F = X_i$



9. $F(X,Y) = \langle 0, X \rangle$



11. $\vec{F} = \left\langle \frac{x}{x^2+y^2}, \frac{y}{x^2+y^2} \right\rangle$



17. C

28. $\operatorname{div}(\vec{F}) = x + z$

$\operatorname{curl}(\vec{F}) = \langle y, 3x^2, -x \rangle$

$y + z + 0$

$2y - y - y$

$0 + 3x^2 - 0 - x$

$2y - y = y$

$0 - -3x^2 = 3x^2$

$y = -x$

25)

$\frac{\partial F_1}{\partial x} =$

$\frac{\partial F_2}{\partial y} =$

$\frac{\partial F_3}{\partial z} = -2 - 2x^2$

25)

$div(F) = 1 - y + 2x^2$

$curl(F) = (-1, -2x^2 - 2x, -x)$

27) $\frac{\partial F_1}{\partial x} = 0$

$\frac{\partial F_2}{\partial y} = 0$

$\frac{\partial F_3}{\partial z} = 0$

$div(F) = 0$

$curl(F) = \langle 1 - 3, 2, -1 - 2x, 1 + 2y \rangle$