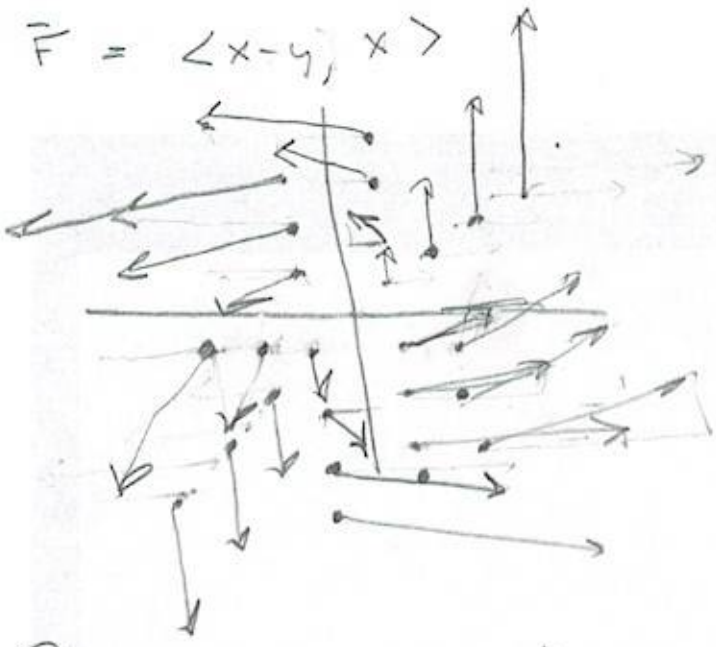
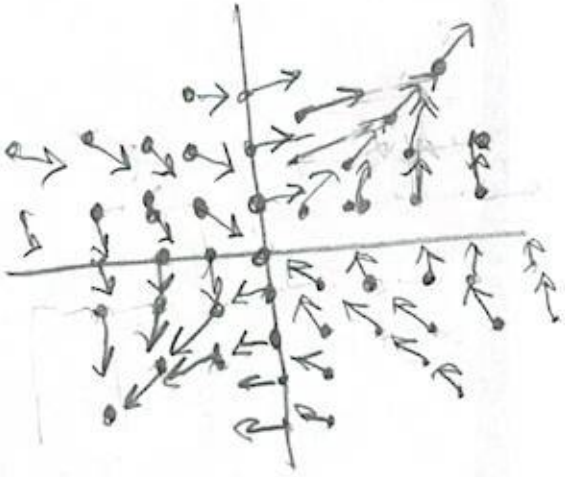
203 § 16.1 #4, 5, 9, 11-19, 28, 23, 24

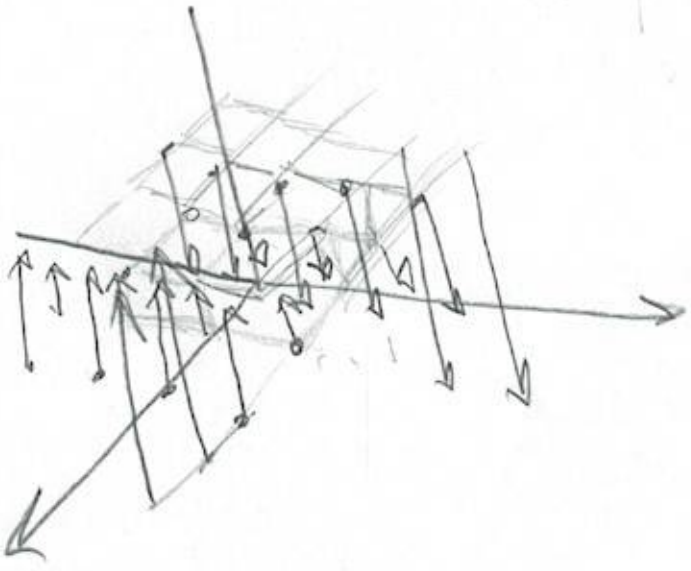
(4) $\vec{F} = \langle x-y, x \rangle$



(5) $\vec{F} = \frac{1}{\sqrt{x^2+y^2}} \langle y, x \rangle$



(9) $\vec{F} = x\vec{k} = \langle 0, 0, x \rangle$



203 Skill #s 11-19, 23, 24, 28

(11) $\bar{F} = \langle y, x \rangle$

(12) $\bar{F} = \langle 1, \sin y \rangle$

(13) $\bar{F} = \langle x-2, x+1 \rangle$

(14) $\bar{F} = \langle y, \frac{1}{x} \rangle$

Matching

#s 15-18 More Matching

(15) $\bar{F} = \langle 1, 2, 3 \rangle$

(16) $\bar{F} = \langle 1, 2, z \rangle$

(17) $\bar{F} = \langle x, y, 3 \rangle$

(18) $\bar{F} = \langle x, y, z \rangle$

(19) CAS Fieldplot $\bar{F} = \langle y^2 - 2xy, 3xy - 6x^2 \rangle$

Explain the appearance by finding (x, y)

ⓐ $\bar{F}(x, y) = \bar{0}$

#s 23-4 Find gradient vector field ∇f

(23) $f = (x^2+y^2+z^2)^{\frac{1}{2}} \longrightarrow$

$\nabla f = \langle \frac{1}{2}(x^2+y^2+z^2)^{-\frac{1}{2}}(2x),$

$\frac{1}{2}(x^2+y^2+z^2)^{-\frac{1}{2}}(2y), \frac{1}{2}(x^2+y^2+z^2)^{-\frac{1}{2}}(2z) \rangle$

$= \boxed{\frac{1}{\sqrt{x^2+y^2+z^2}} \langle x, y, z \rangle = \nabla f}$

203 § 16.1 #s 24, 28

(24) $f = x\cos\left(\frac{y}{z}\right) = x\cos(yz^{-1})$

$\rightarrow \nabla f = \langle \cos(yz^{-1}), -xz^{-1}\sin(yz^{-1}),$

$(-x\sin(yz^{-1}))(-yz^{-2}) \rangle$

$= \langle \cos\left(\frac{y}{z}\right), -\frac{x}{z}\sin\left(\frac{y}{z}\right), \frac{xy}{z^2}\sin\left(\frac{y}{z}\right) \rangle$

#s 27-28 Plot ∇f with contour map of f. Explain how they're related.

(28) $f = \sin(x+y) \Rightarrow$

$\nabla f = \langle \cos(x+y), \cos(x+y) \rangle$