Mathe 32B Lecture 2 Winter 2020	Homework 5	Due February 7, in class
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Name:

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- Exercises are taken from J. Rogawski, C. Adams, R. Franzosa *Calculus, Multivariable,* 4th Ed., W. H. Freeman & Company.

Section 17.1 Vector Fields

Exercises in the textbook

In Exercises 13–16, *match each of the following planar vector fields with the corresponding plot in Figure* 10.

- **13. F** = (2, x)
- **14.** $F = \langle 2x + 2, y \rangle$
- **15.** $\mathbf{F} = \langle y, \cos x \rangle$

16. F = $\langle x + y, x - y \rangle$



Rogawski et al., *Multivariable Calculus*, 4e, © 2019 W. H. Freeman and Company

Figure 10

22. The velocity vectors in kilometers per hour for the wind speed of a tornado near the ground are given by the vector field

$$\mathbf{F} = \left\langle \frac{-y}{e^{(x^2 + y^2 - 1)^2}}, \frac{x}{e^{(x^2 + y^2 - 1)^2}} \right\rangle$$

Determine the coordinates of those points where the wind speed is the highest.

In Exercises 23–30, calculate $div(\mathbf{F})$ and $curl(\mathbf{F}).$

23. $\mathbf{F} = \langle x, y, z \rangle$

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27. $\mathbf{F} = \langle yz, zx, xy \rangle$	29. $\mathbf{F} = \langle e^{i \mathbf{y}}, \sin i \mathbf{x} \rangle$	$x, \cos x$

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38. Find (by inspection) a potent $\langle x, 0 \rangle$ and prove that G = $\langle y, 0 \rangle$ is r	ial function for $\mathbf{F} =$ not conservative.	42. F = ⟨ <i>yz</i>	, xz, y⟩		
In Exercises 39–47, find a potential y field F by inspection or show that one of 39. $\mathbf{F} = \langle x, y \rangle$	function for the vector does not exist.	50. Let φ = terms of the	= ln <i>r</i> , wl	here $r = \sqrt{x^2 + y^2}$. ial vector \mathbf{e}_r in \mathbf{R}^2 .	Express $\nabla \varphi$ in
40. $\mathbf{F} = \langle y, x \rangle$					