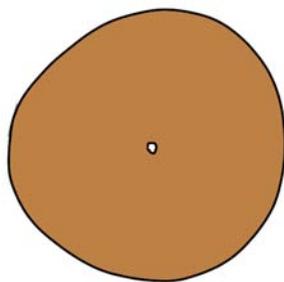
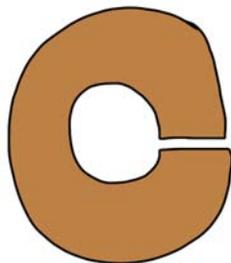


## Problems: Simply Connected Regions

1. Which of the regions shown below are simply connected?



(a)



(b)



(c)

For each of the vector fields described below, find the domain on which it is defined and continuously differentiable. Is that domain simply connected?

2.  $\sin(x^2 + y^2)\mathbf{i} + \cos(x^2 + y^2)\mathbf{j}$

3.  $|x|\mathbf{i} + 0\mathbf{j}$

4.  $\frac{x\mathbf{i} + y\mathbf{j}}{x^2 + y^2}$

5.  $\frac{y\mathbf{i} - x\mathbf{j}}{y^2}$

6.  $\sqrt{x^2 - 1}\mathbf{i} + \sqrt{y^2 - 1}\mathbf{j}$

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18.02SC Multivariable Calculus  
Fall 2010

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