

Calculus II, Section 9.2, #2  
Direction Fields and Euler's Method

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A direction field for the differential equation  $y' = \tan\left(\frac{1}{2}\pi y\right)$  is shown at right.<sup>1</sup>

(a) Sketch the graphs of the solutions that satisfy the given initial conditions.

(i)  $y(0) = 1$

(ii)  $y(0) = 0.2$

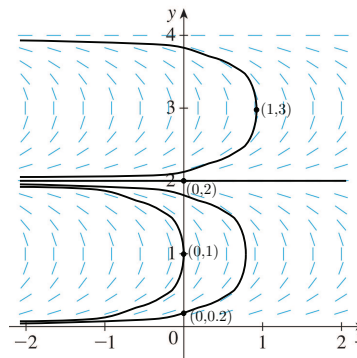
(iii)  $y(0) = 2$

(iv)  $y(1) = 3$

The graphs of the solutions are sketched on the direction field at right.

(b) Find all equilibrium solutions.

The equilibrium solutions are where the slope is zero. From the vector field, they seem to be  $y = 0$ ,  $y = 2$ , and  $y = 4$ .



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<sup>1</sup>Stewart, *Calculus, Early Transcendentals*, p. 597, #2.