

# IB Mathematics HL 13

## Euler's Method Assignment

February 29, 2016

Consider the differential equation  $\frac{dy}{dx} = \frac{y}{x + \sqrt{xy}}$ , for  $y, x > 0$ .

1. Use Euler's method starting at the point  $(x, y) = (1, 2)$ ,  
with interval  $h = 0.2$ , to find an approximate value of  $y$  when  $x = 1.6$ . [7 marks]

2. Use the substitution  $y = vx$  to show that [3 marks]

$$x \frac{dv}{dx} = \frac{v}{1 + \sqrt{v}} - v.$$

3. (a) Hence find the solution of the differential equation in  
the form  $f(x, y) = 0$ , given that  $y = 2$  when  $x = 1$ . [9 marks]  
(b) Find the value of  $y$  when  $x = 1.6$ .