

# MTH 376

## Homework 2

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### 1 Section 1.3

6. (a) 2  
(b) if  $x > 1$  then  $x + \sin(y) \geq 0$  for all  $y$ , so  $\frac{dy}{dx} \geq 0$ .  
(c) start with  $\frac{d^2y}{dx^2} = 1 + \cos(y)y'$  and substitute  $y'$ .  
(d) use the second derivative test using the formula obtained in part (c).
8. (a) 7  
(b) start with  $\frac{d^2y}{dx^2} = 3t^2 - 3x^2 \frac{dx}{dt}$ .  
(c) to reach  $x = 1$  the function must decrease, that is,  $\frac{dx}{dt}$  must be negative, use the hint to argue that this cannot happen if  $1 < x < 2$  and  $t > 2.5$ .

### 2 Section 2.2

12.  $4v^2 = 1 + Cx^{-8/3}$ .  
26.  $y = (1 - \ln \sqrt{1+x})^2$ .

### 3 Section 2.3

10.  $y = -x^{-3} + Cx^{-2}$ .  
14.  $y = \frac{x^3}{6} - \frac{2x^2}{5} + x + Cx^{-3}$ .  
30. (b)  $y = \left(\frac{x}{2} - \frac{1}{12} + Ce^{-6x}\right)^{1/3}$ .