

## Exercise Sheet 4

Hand in your work by 30 October.

1. (Warm-up question\*) Find the derivatives of the hyperbolic functions  $\sinh$  and  $\cosh$ .
2. Find the derivatives of the following expressions.
  - (a)  $\sin^2(3x) + (x - 2)^2 \ln(2x)$
  - (b)  $5^{10x} - \log_{10} x^5$
3. (a) Compute the slope  $\frac{dy}{dx}$  at the point  $(4, 5)$  for the curve given parametrically by

$$x(t) = t^3 + 4t - 1, \quad y(t) = 2t^2 + 7t - 4.$$

- (b) Compute the slope  $\frac{dy}{dx}$  at the point  $(1, -\frac{1}{3})$  for the curve given implicitly by

$$x^2(y + 2x) + 3y^2 = 2.$$

4. Find the local minima and maxima of the function  $f(x) = x^3 - 4x^2 + 4x + 1$ .

Solutions will be available after the hand-in date at:  
<http://people.bath.ac.uk/rm257/MA10192/>

RM, 13/10/2017

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\*Do not hand in your work for this question.