Exercise Sheet 9

Hand in your work by 4 December.

1. (Warm-up question*) Find the general solution of the equation

$$\frac{dy}{dx} = 9x.$$

2. Find the general solution of the following ordinary differential equation.

$$x\frac{dy}{dx} = yx^2.$$

   Find the particular solution that satsifies the initial condition $y = 3$ at $x = 0$.

3. Solve the following differential equations using an appropriate method.

   (a) $3\dfrac{dy}{dx} + y = yx^2$

   (b) $x\dfrac{dy}{dx} + 2x^2y = 6x^2$

   (c) $\dfrac{dy}{dx} + 4y = xe^{-5x}$

   (d) $\dfrac{dy}{dx} + 5y = \sin x.$

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

RM, 14/11/2017

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*Do not hand in your work for this question.