

EDDE. PROBLEM SET 1

1. Find an ordinary differential equation satisfied by any function of the form $y(x) = (x + C)^2$ where $C \in \mathbf{R}$.

2. Do the same as above for:

$$y(x) = x^2 + C;$$

$$y(x) = x^2 + Cx + D;$$

$$y(x) = Cx^2;$$

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

3. Assuming that $x \cdot y'(x) - y(x) = x^2$, write the differential equation satisfied by $z(x) = y(x)/x$. Solve that equation for $z(x)$, and deduce what is $y(x)$.
4. Assuming that $x^2 \cdot y''(x) - 2x \cdot y'(x) + 2y(x) = 0$, write the differential equation satisfied by $z(x) = y(x)/x$. Solve that equation for $z(x)$, and deduce what is $y(x)$.