

WRITE YOUR NAME:

MAP 2302 Quiz 14  
Thursday October 24th

By looking for solutions of the form  $y = t^r$ , find two linearly independent solutions of the differential equation.

$$t^2 y'' + 7ty' - 7y = 0$$
$$y = t^r \Rightarrow y' = r t^{r-1} \Rightarrow y'' = r(r-1) t^{r-2}$$

Plug those into the D.E.

$$\underbrace{t^2 \cdot r(r-1) t^{r-2}}_{y''} + 7t \cdot \underbrace{r t^{r-1}}_{y'} - 7 \cdot \underbrace{t^r}_y = 0$$

$$t^r \cdot (r(r-1) + 7r - 7) = 0$$

$$r^2 - r + 7r - 7 = 0$$

$$r^2 + 6r - 7 = 0$$

$$(r+7)(r-1) = 0$$

$$r = -7 \text{ or } r = 1$$

$y = t^{-7}$  and  $y = t$  are two independent solutions