AP SOLUTION

(HW # 8)

AP) (a) i) FIRST OF ALL $y = y_0 + y_p$ SOLVES $T(y) = f$

BECAUSE $T(y) = T(y_0 + y_p) = \underbrace{T(y_0)}_{0} + \underbrace{T(y_p)}_{f} = f$

ii) NOW IF y SOLVES $T(y) = f$ AND y_p IS GIVEN

DEFINE $y_0 = y - y_p$, THEN

$$T(y_0) = T(y - y_p) = \underbrace{T(y)}_{f} - \underbrace{T(y_p)}_{f} = f - f = 0$$

SO y_0 SOLVES $T(y_0) = 0$

FINALLY, $y_0 = y - y_p \Rightarrow y = y_0 + y_p$ ✓

(b) $T(y_1 + cy_2) = (y_1 + cy_2)'' - 5(y_1 + cy_2)' + 6(y_1 + cy_2)$

$= y_1'' + cy_2'' - 5y_1' - 5cy_2' + 6y_1 + 6cy_2$

$= (y_1'' - 5y_1' + 6y_1) + c(y_2'' - 5y_2' + 6y_2)$

$= T(y_1) + cT(y_2)$ ✓

(c) $T(y) = 0 \Rightarrow y'' - 5y' + 6y = 0$

AUX $r^2 - 5r + 6 = 0 \Rightarrow (r-2)(r-3) = 0 \Rightarrow r = 2, r = 3$