6 a Trend   - upward
     Seasonality

b 1) it Stationary?   Stationary in mean?
   Not because of upward trend and slight seasonality

c.

e i. LHS: $(1-B)(1-B^{12})y_t$

$[1 - B^{12} - B + B^{13}]y_t = y_t - B^{12}y_t - By_t + B^{13}y_t$ recall $B^k y_t = y_{t-k}$

$= y_t - y_{t-12} - y_{t-1} - y_{t-13}$

RHS $(1-\theta_1 B)(1 - \alpha_1 B^2)\varepsilon_t = (1 - \alpha_1 B^{12} - \theta B + \alpha_1 \theta_1 B^{13})\varepsilon_t$

$= [\varepsilon_t - \alpha_1 B^{12}\varepsilon_t - \theta B\varepsilon_t + \alpha_1 \theta_1 B^{13}\varepsilon_t]$

$= \varepsilon_t - \alpha_1 \varepsilon_{t-12} - \theta_1\varepsilon_{t-1} + \alpha_1\varepsilon_{t-1} + \alpha_1\theta_1\varepsilon_{t-13}$

ii proposed $ARIMA(0,1,1)(0,1,1)_{12}$ Seasonly 12 $\Rightarrow$ acf.

No obvious trend

	ACF	PAF
ARp		Spike at lag 1 to p
MAp	Spike at 1 to Q	

	ACF	PACF
SARp		Spike at lags S, 2S, ... PS
SMAq	Spike at lags qS, 2S...QS	

ARIMA $(0, 1, 1)$ $(0, 1, M)_{12}$

Sma spike at lag 12
in acf

mu
Spike at lag
1 in acf

Integral difference remove trend and seasonality — now stat
i.e. TS is now stationary