

6a

$$\langle x^4, p_3 \rangle = \int_{-\infty}^{\infty} x^4 \left(x^3 - \frac{3}{5}x \right) dx = 0$$

$$\rightarrow p_4 = x^4 - \frac{6}{5}p_2 - \frac{1}{5}p_0$$

$$= \boxed{x^4 - \frac{6}{5}\left(x^2 - \frac{1}{3}\right) - \frac{1}{5}}$$

6b

$$x^4 = p_4 - \alpha_{43}p_3 - \alpha_{42}p_2 - \alpha_{41}p_1 - \alpha_{40}p_0$$

$$= p_4 - \alpha_{42}p_2 - \alpha_{40}p_0$$