

1. – 24.15 (ungraded).
  2. – 24.16.
  3. – 25.10.
  4. – 26.2.
  5. – 26.3 (ungraded).
  6. – 26.4.
  7. – 26.6. (In (b), use (a), but don't try to square the series term by term.)
  8. – 28.2 ad.
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9. – 26.8.
10. – Find a family of polynomials  $p_n(x)$  so that

$$f_n(x) = 1 + 3x + 5x^2 + \cdots + (2n + 1)x^n = \sum_{k=0}^n (2k + 1)x^k = \frac{p_n(x)}{(1 - x)^2}.$$

For example,

$$\begin{aligned}p_0(x) &= 1 - 2x + x^2, \\p_1(x) &= 1 + x - 5x^2 + 3x^2, \\p_2(x) &= 1 + x - 7x^3 + 5x^4, \\p_3(x) &= 1 + x - 9x^4 + 7x^5.\end{aligned}$$

You may want to prove the formula you can guess by induction, or any other correct method. Use this formula, together with the fact that  $\lim nx^n = 0$  if  $|x| < 1$  to get a closed form for the power series

$$\sum_{k=0}^{\infty} (2k + 1)x^k$$

on  $(-1, 1)$ .