

1. – 24.1 (ungraded).
 2. – 24.9 (ungraded).
 3. – 26.7 (ungraded).
 4. – 24.2.
 5. – 25.10.
 6. – 26.6. (In (b) it is much easier to use (a) than it is to square the series term by term.)
 7. – (E) Let $f(x)$ be the power series from Homework 8 #7. Determine a power series for $f'(x)$ and express it as a rational function, then use this to find a closed form for $f(x)$.
 8. – (E) For which x does $\sum x^{3n}$ converge? Determine $f(x)$ as a rational function. Determine by any correct method $\sum \frac{n}{8^n}$.
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9. – 24.14.

10a. – Find a closed form for

$$\sum_{n=0}^{\infty} (-1)^n \frac{x^{3n+1}}{3n+1} = x - \frac{x^4}{4} + \frac{x^7}{7} - \frac{x^{10}}{10} + \cdots$$

Use Abel's formula to find $1 - \frac{1}{4} + \frac{1}{7} - \frac{1}{10} + \cdots$ in closed form. Hints: Break out your old calculus book! You may use your favorite silicon friend to check your answer or even derive it (I can't stop you), **BUT** you must justify your answer the old-fashioned way. It may be useful, for purposes of partial fractions, to note that $1 + x^3 = (1 + x)(1 - x + x^2)$ and/or $1 - x^3 = (1 - x)(1 + x + x^2)$.

10b. Same question for

$$\sum_{n=0}^{\infty} \frac{x^{4n+1}}{4n+1} = x + \frac{x^5}{5} + \frac{x^9}{9} + \frac{x^{13}}{13} + \cdots$$

and $1 - \frac{1}{5} + \frac{1}{9} - \frac{1}{13} + \cdots$.