1. (taylor:sinx2)
   Compute the second order Taylor polynomial of $\sin(x^2)$ around 0 and use this to approximate $\sin(\frac{1}{4})$.

2. (taylor:etan)
   Compute the degree two Taylor polynomial of the function $f(x) = e^{\tan(x)}$ around 0. Use this to estimate $e^{\tan(.1)}$.

3. (taylor:sinexp)
   Compute the second order Taylor polynomial of $\sin(e^x - 1)$ around 0 and use this to approximate $\sin(e^{\frac{1}{2}} - 1)$.

4. (taylor:polynomial)
   Find the second and fourth order Taylor expansions around 1 for the function $f(x) = x^3 + 5x + 1$.

5. (taylor:intexp2)
   Find the second order Taylor polynomial around 0 for $f(x) = \int_0^x e^{-t^2} dt$ and use this to estimate $f(.1)$.

6. (taylor:intexpsin)
   Find the first order Taylor polynomial for the function $f(x) = \int_0^{\sin(x)} e^{-t^3} dt$ and use this to find an approximation for $f(\frac{1}{2})$.

7. (taylor:intcomp)
   Find the second order Taylor polynomial of $\cos(x)$ around 0 then integrate this polynomial. Additionally, find the third order Taylor polynomial of $\sin(x)$ around 0 . Recall that $\int \cos(x)dx = \sin(x) + C$ and compare your answer to the previously computed Taylor polynomial for the integral of $\cos(x)$.

8. (taylor:arctanseries)
   Find the Taylor series around 0 for $\arctan(x)$, $T_\infty^0 \arctan(x)$.

9. (taylor:cosh2series)
   Find the Taylor series around zero for $\cosh(2x) = \frac{1}{2}\left(e^{2x} + e^{-2x}\right)$.

10. (taylor:sinhx2series)
    Find the Taylor series around zero for $\sinh(x^2) = \frac{1}{2}\left(e^{x^2} - e^{-x^2}\right)$.

11. (taylor:exp/1-x)
    Find the degree two Taylor polynomial around 0 of $\frac{e^x}{1-x}$ without computing any derivatives.

12. (taylor:ex3)
    Find the degree nine Taylor polynomial around zero for e^{x^3} without computing any derivatives.

13. (taylor:calcplusoh)
    Compute the degree seven Taylor polynomial around zero for $\frac{4x^3}{(1-x^4)^2}$.
    Hint: You should not differentiate this function.

14. (taylor:14expminus)
    Find $T_{14}^0 e^{x^6} - \frac{1}{1-x^5}$.

15. (taylor:expplusseries)
    Find

$$T_\infty^0 x \left(e^x - \frac{1}{1-x} \right)$$

16. (taylor:seriesrational)
    Find the Taylor series around 0 (T_∞^0) of the function $f(x) = \frac{10x^4}{(1-x^5)^2}$