Alternating Estimation Theorem

1. \( f(x) = x^{2/3} \) centered at \( x = 1 \)
   a. Given the function, find the fourth order polynomial
   c. Use the alternate estimation theorem to determine the error bound
      \[ |f(x) - P(x)| \leq R \text{ at } x = 1.2 \]

2. \( f(x) = x^{-2} \) centered at \( x = 1 \)
   a. Given the function, find the fourth order polynomial
   c. Use the alternate estimation theorem to determine the error bound
      \[ |f(x) - P(x)| \leq R \text{ at } x = 1.1 \]

3. \( f(x) = \frac{1}{1+x} \) centered at \( x = 0 \)
   a. Given the function, find the fourth order polynomial
   c. Use the alternate estimation theorem to determine the error bound
      \[ |f(x) - P(x)| \leq R \text{ at } x = -.1 \]

4. \( f(x) = \sin x \) centered at \( x = 0 \)
   a. Given the function, find the fourth order polynomial
   c. Use the alternate estimation theorem to determine the error bound
      \[ |f(x) - P(x)| \leq R \text{ at } x = -.1 \]

5. \( f(x) = \cos x \) centered at \( x = 0 \)
   a. Given the function, find the fourth order polynomial
   c. Use the alternate estimation theorem to determine the error bound
      \[ |f(x) - P(x)| \leq R \text{ at } x = .1 \]

6. \( f(x) = \ln(1 + x) \) centered at \( x = 0 \)
   a. Given the function, find the fourth order polynomial
   c. Use the alternate estimation theorem to determine the error bound
      \[ |f(x) - P(x)| \leq R \text{ at } x = .1 \]