1. (a) Add these fractions: $\dfrac{2}{x+1}+\dfrac{3}{x+2}$

   (b) Evaluate: $\displaystyle\int \frac{5x+7}{(x+1)(x+2)}\,dx$

   (c) Evaluate: $\displaystyle\int \frac{2}{x^2-1}\,dx$

2. Evaluate: $\displaystyle\int \frac{-(2x+26)}{x^2+2x-15}\,dx$

3. Evaluate: $\displaystyle\lim_{n\to\infty}\sum_{k=1}^{n} 5\left(\frac{2k}{n}\right)^3\frac{2}{n}$

4. Let $f(t)=\cos(t)$. Find Find $f^{[42]}(t)$ (the 42^{st} derivative of $f(t)$ with respect to t.)

5. Earlier this week, we looked at $C(t)=\dfrac{e^t+e^{-t}}{2}$.

   (a) Find $C'(t)$ and $C''(t)$

   (b) Find $C^{[42]}(t)$.

   (c) Let's consider a related function, $S(t)=\dfrac{e^t-e^{-t}}{2}$. Come up with relationships between our two functions, $C(t)$ and $S(t)$.