



January 23

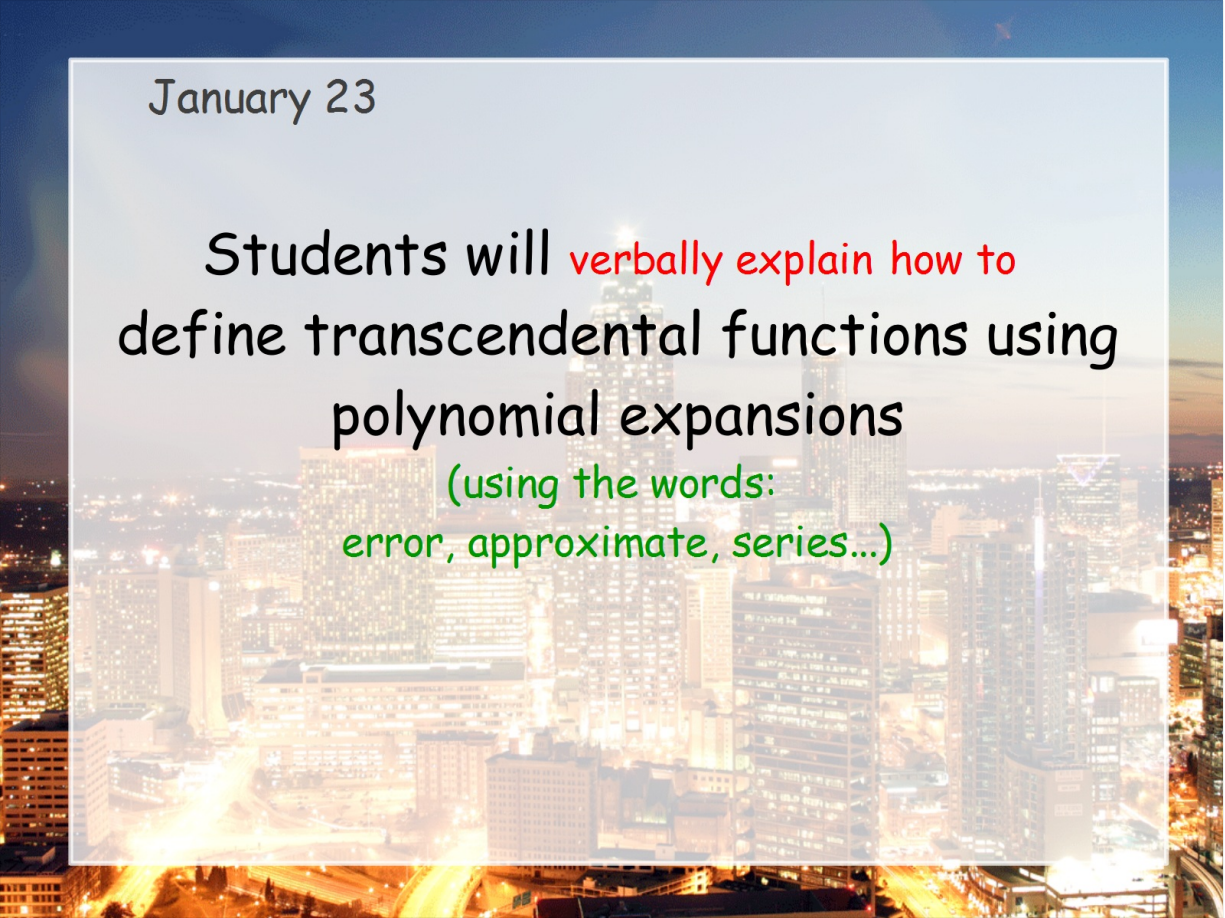
Evaluate each of the following  
without a calculator:

$$\sin(\pi) = 0$$

$$\sin(\pi/2) = 1$$

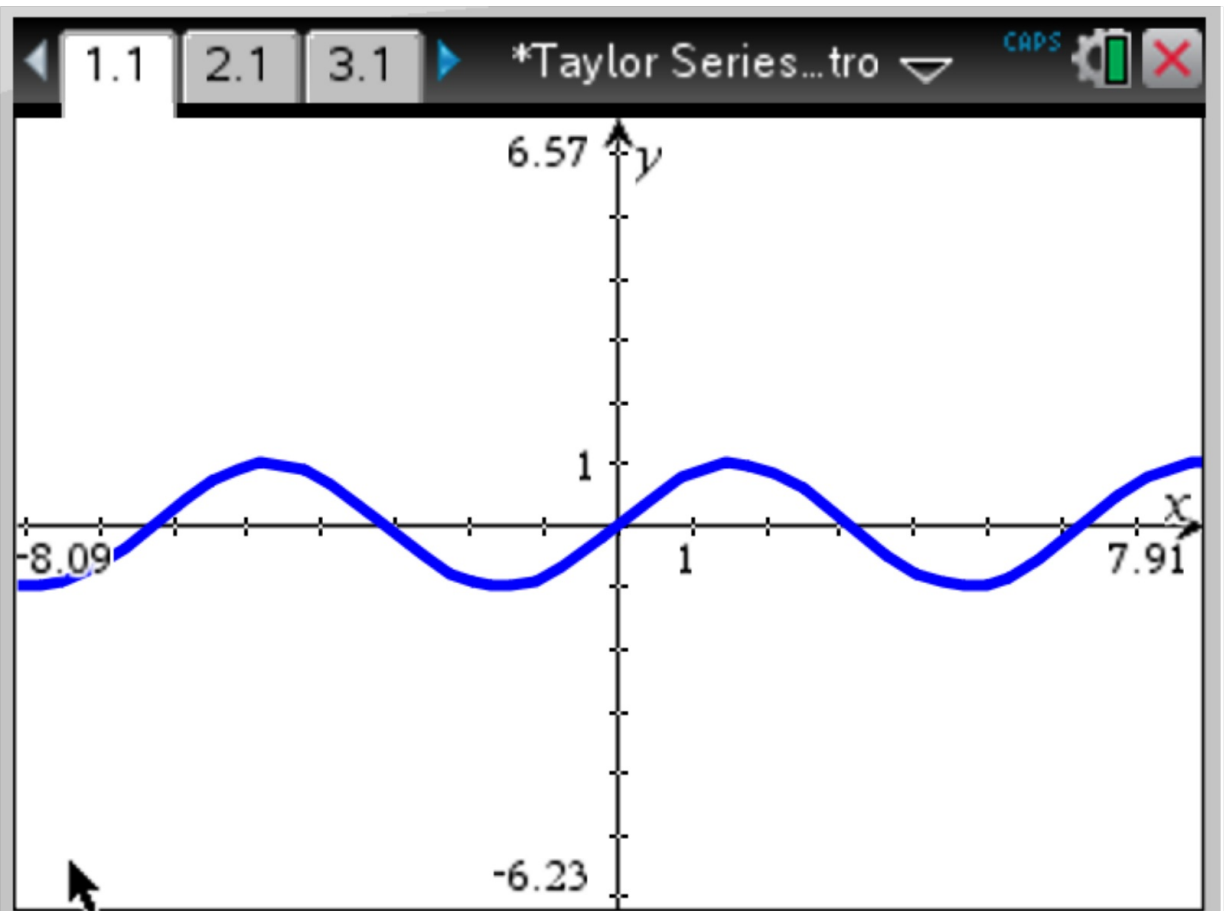
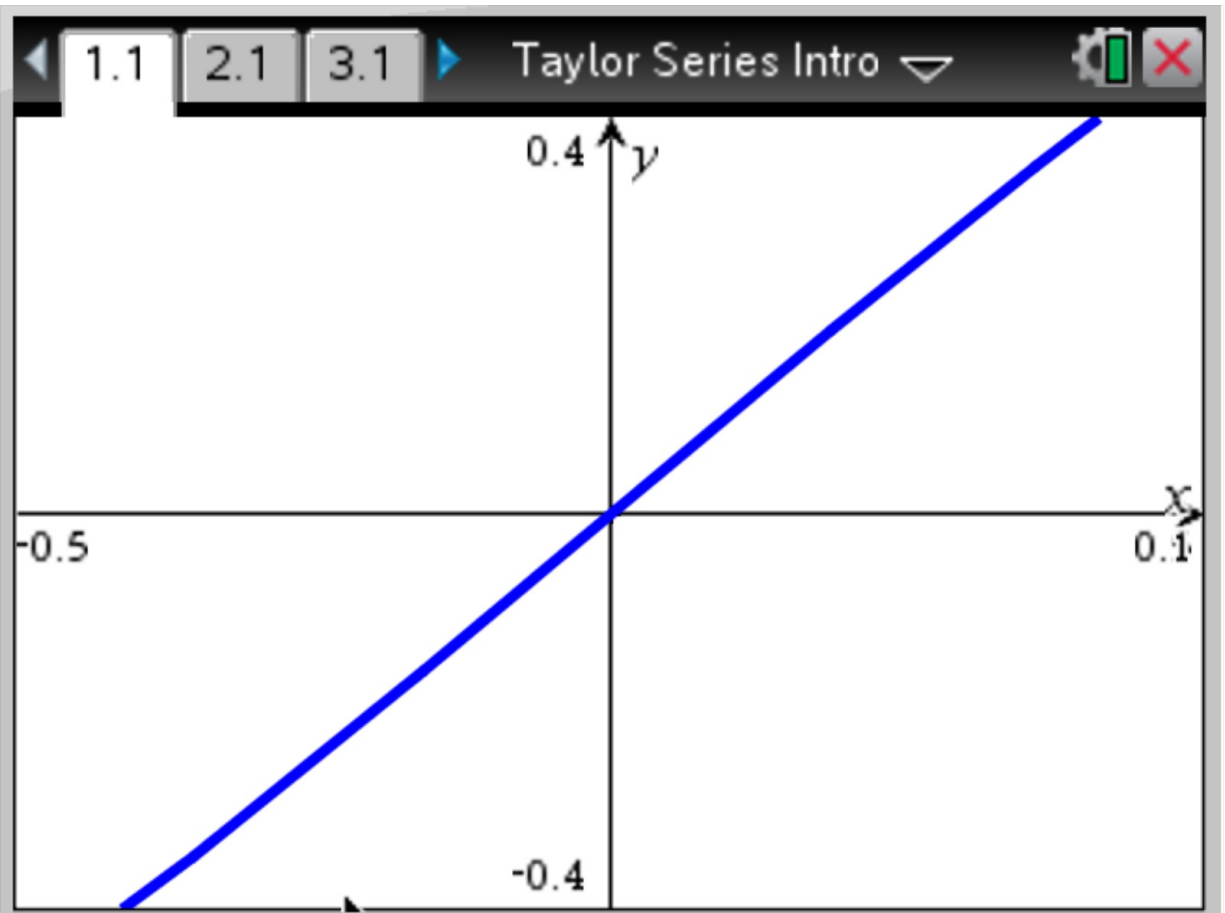
$$\sin(\pi/3) = \frac{\sqrt{3}}{2}$$

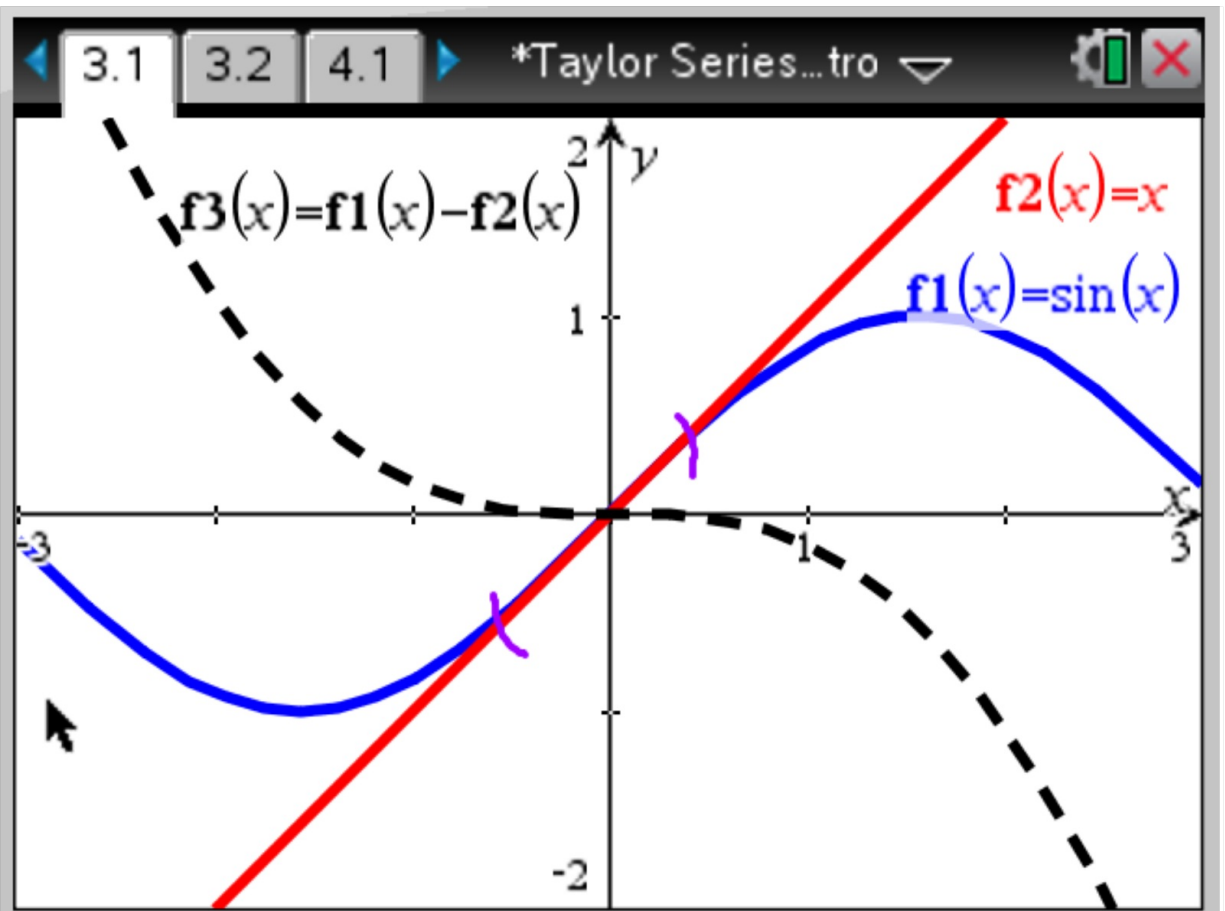
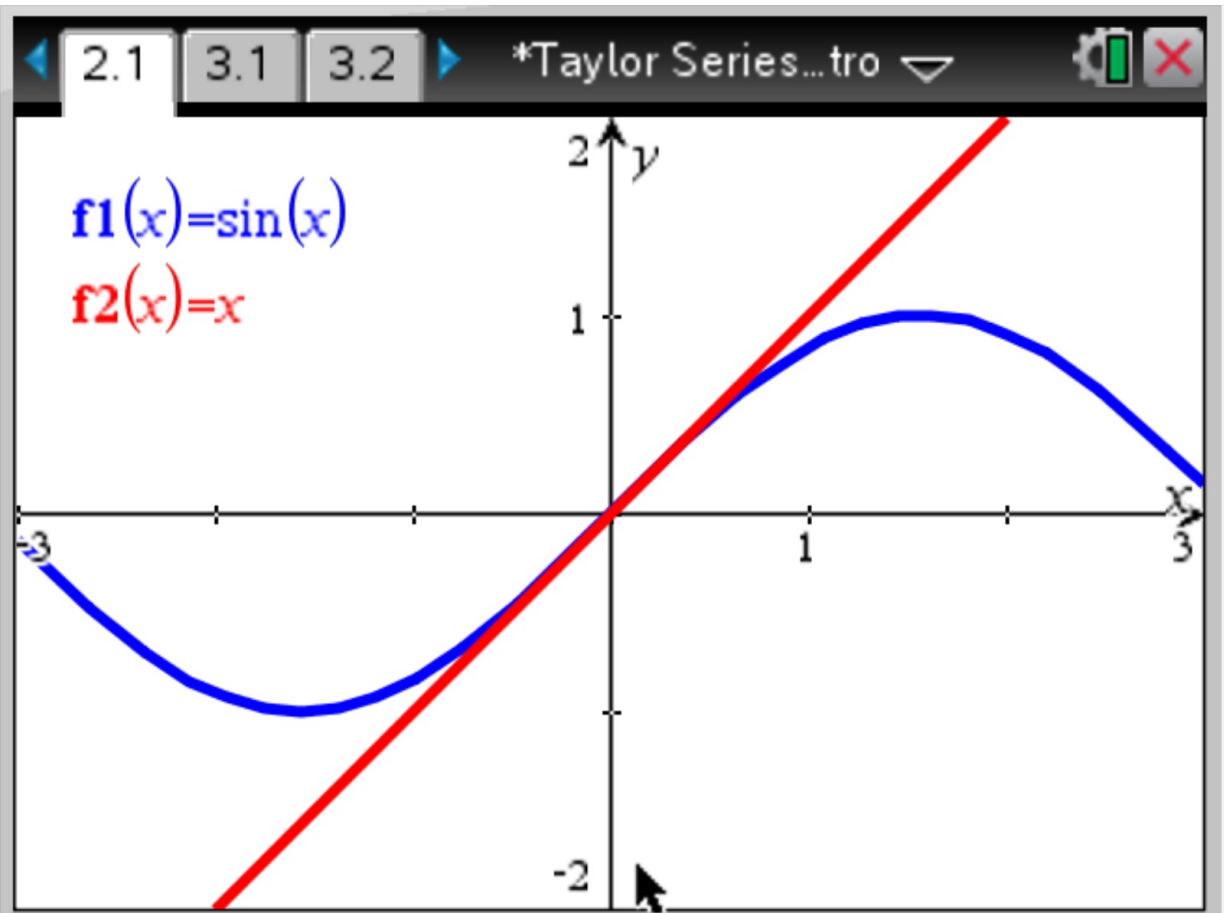
$$\sin(\pi/6) = \frac{1}{2}$$

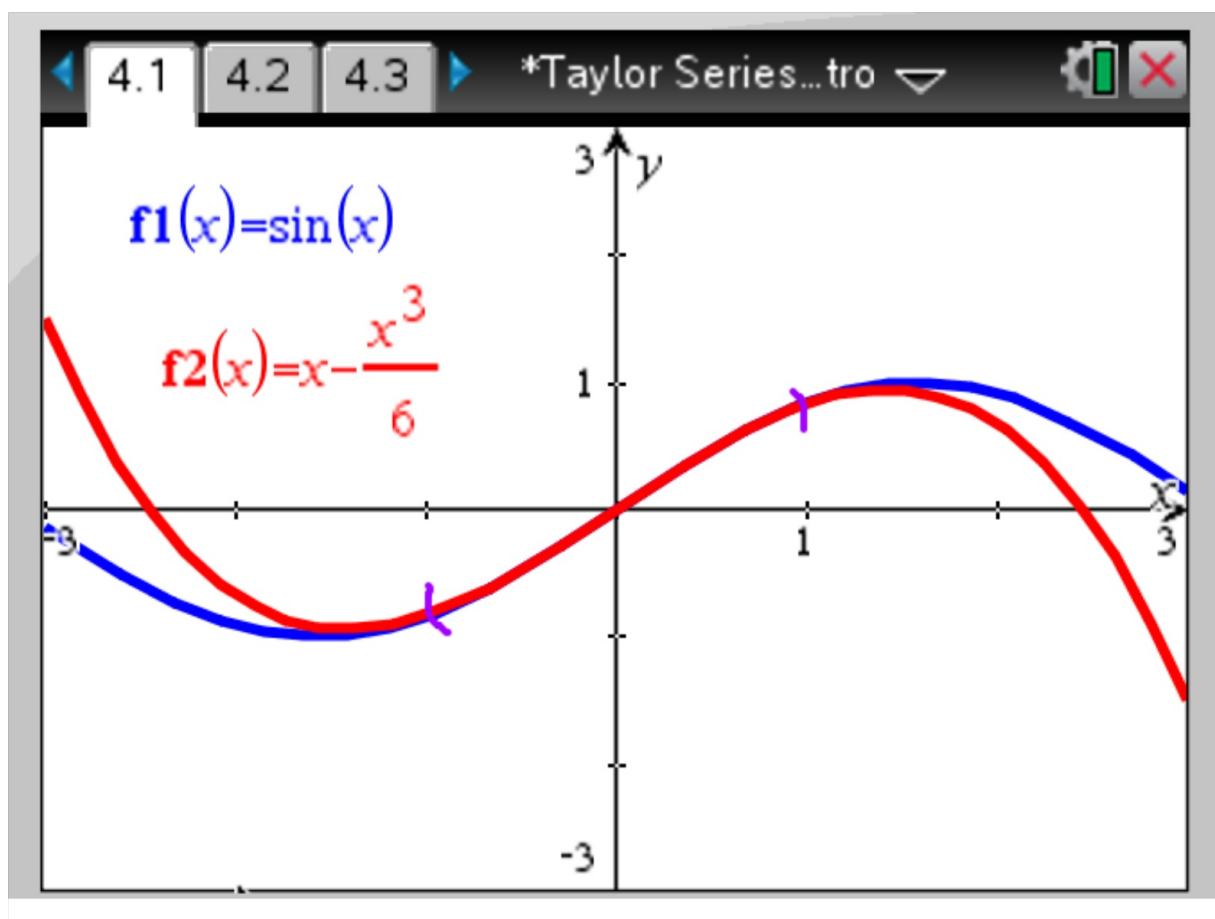
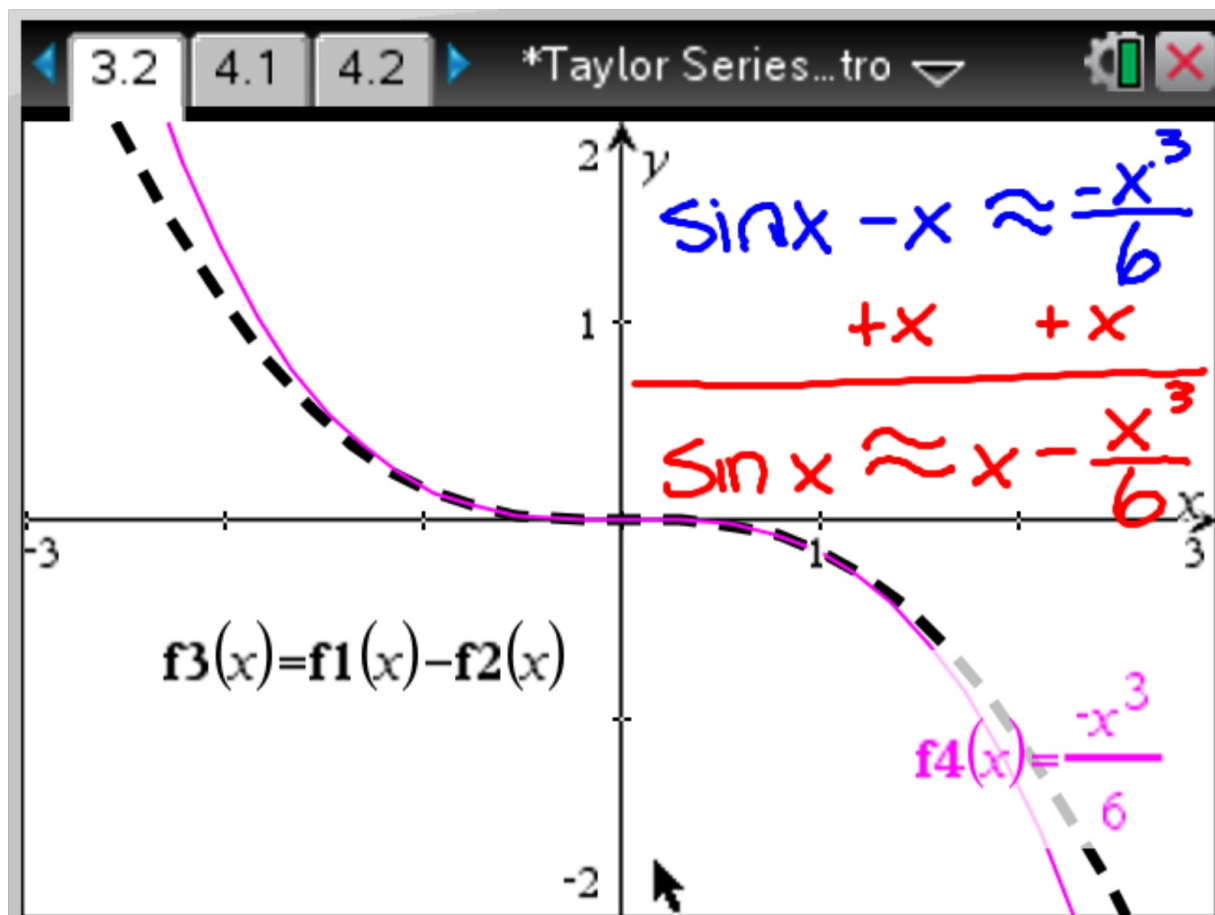


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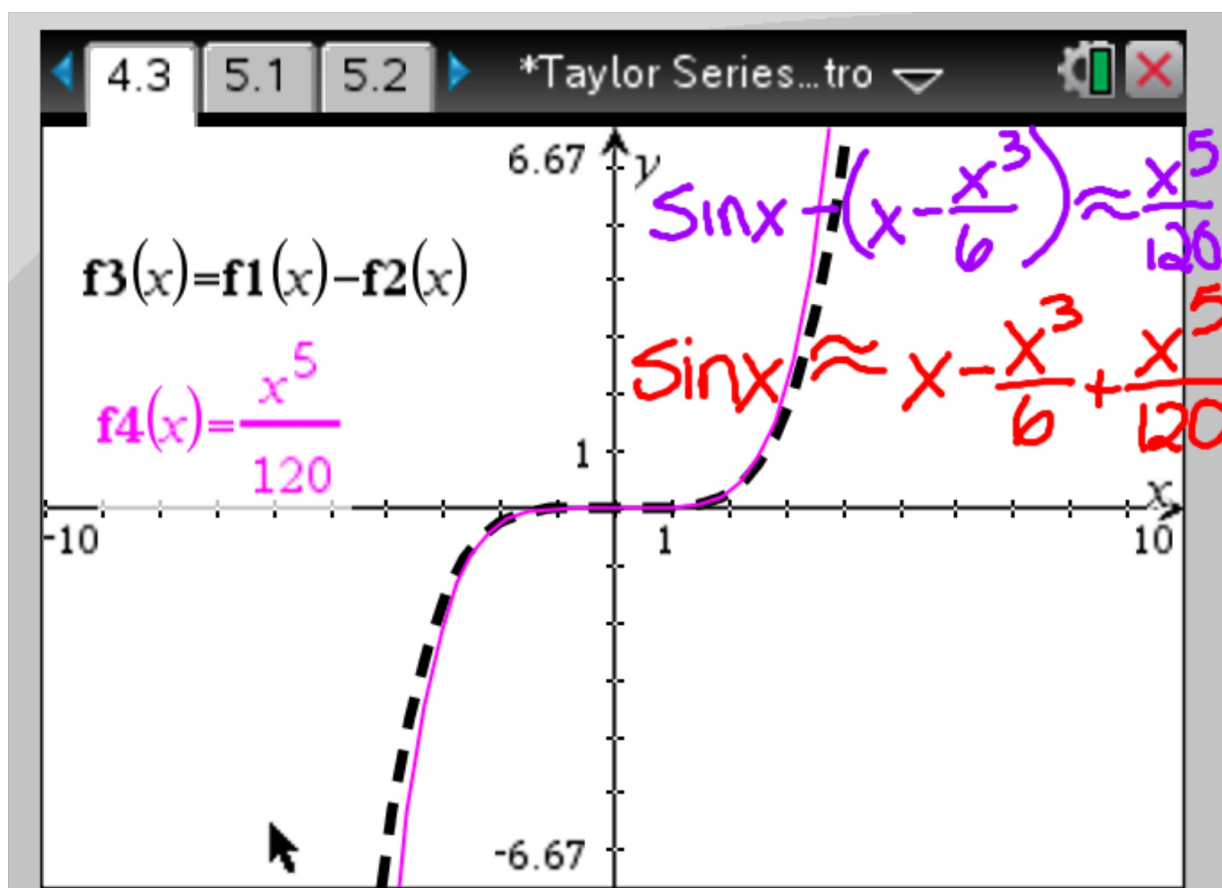
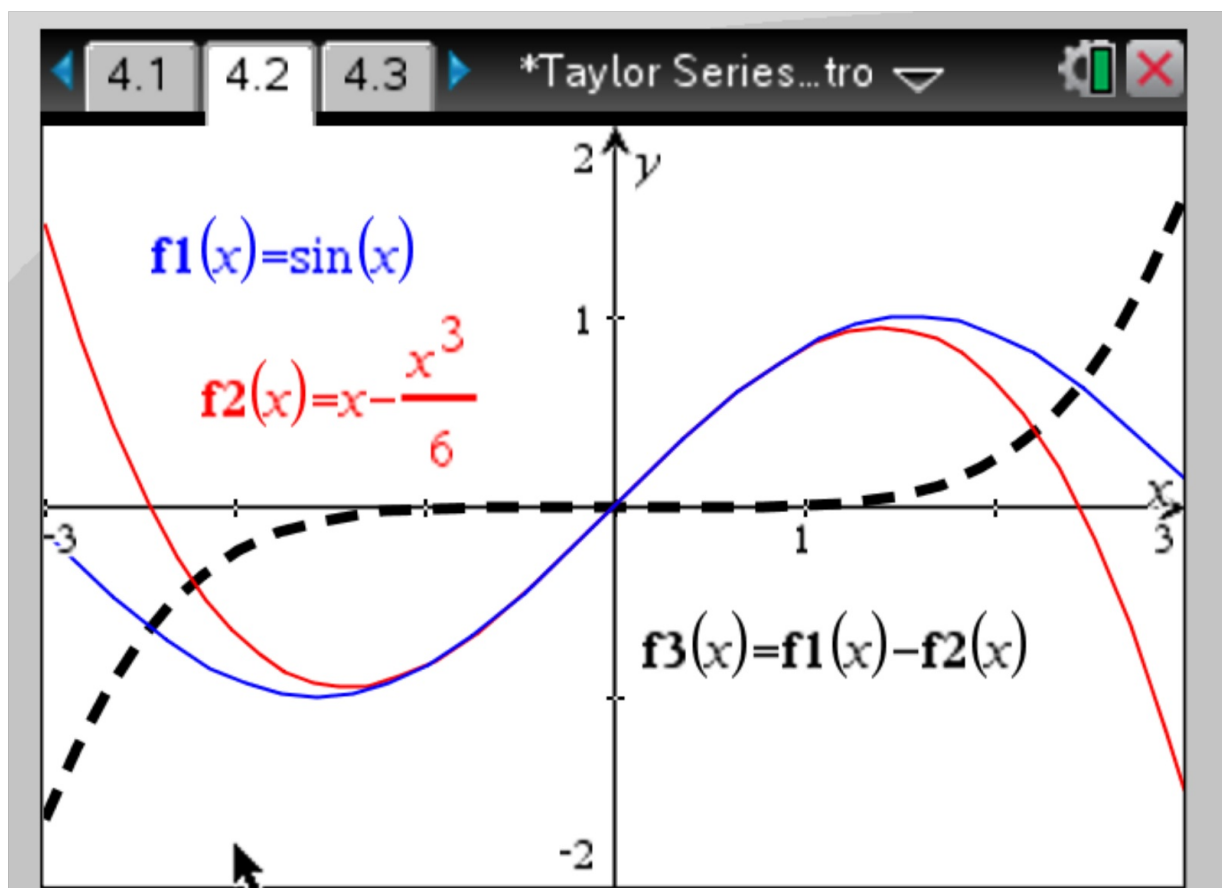
Students will verbally explain how to  
define transcendental functions using  
polynomial expansions  
(using the words:  
error, approximate, series...)

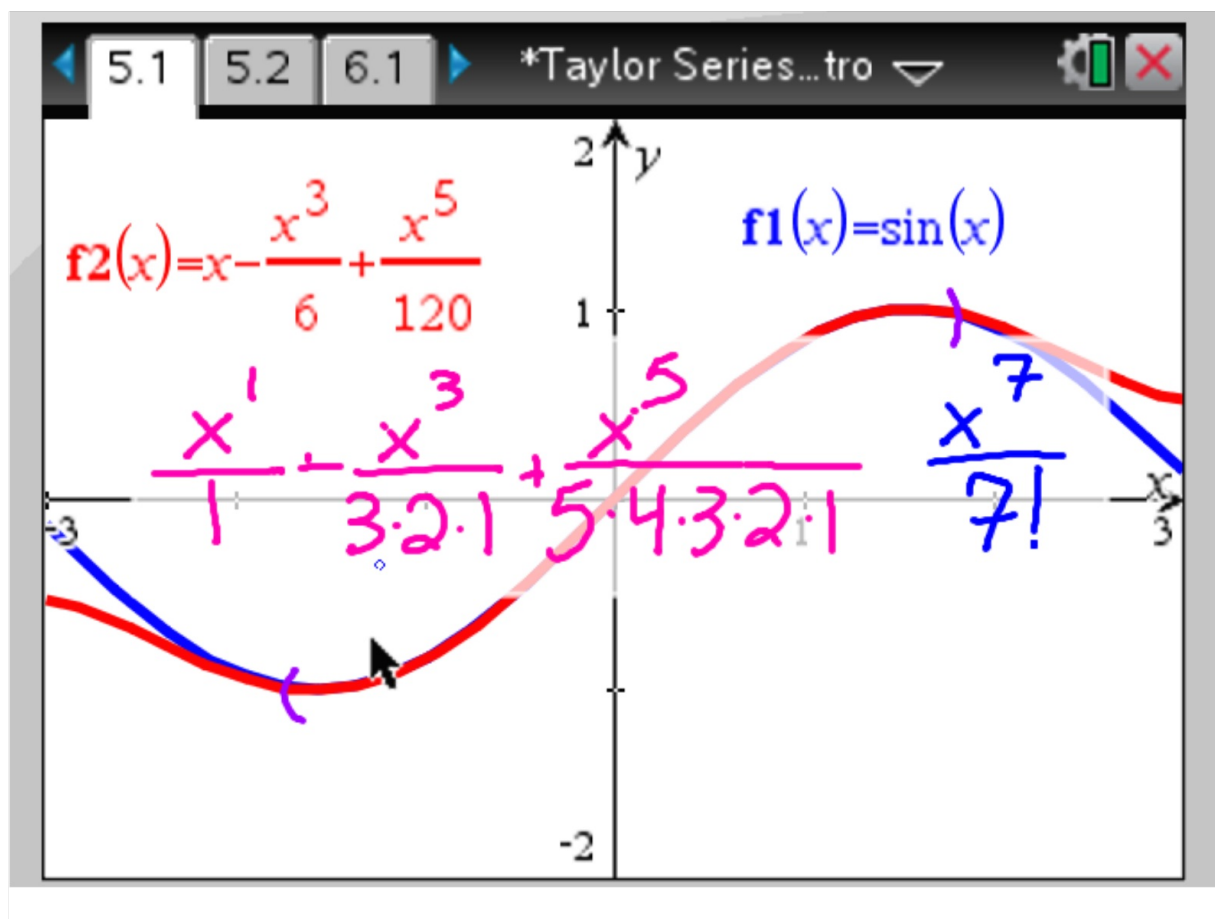












$$\sin x \approx x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots + \frac{(-1)^n x^{2n+1}}{(2n+1)!} + \dots$$

$$= \sum_{n=0}^{\infty} \frac{(-1)^n x^{2n+1}}{(2n+1)!}$$

$$\cos x \approx 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \dots + \frac{(-1)^n x^{2n}}{(2n)!}$$

$$= \sum_{n=0}^{\infty} \frac{(-1)^n x^{2n}}{(2n)!}$$

$$\sin x \approx x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots + \frac{(-1)^n x^{2n+1}}{(2n+1)!} + \dots$$

$$\frac{d}{dx}(\sin x)$$

$$\cos x \approx 1 - \frac{3x^2}{3 \cdot 2 \cdot 1} + \frac{5x^4}{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} - \frac{7x^6}{7 \cdot 6!}$$

$$\cos x \approx 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \dots + \frac{(-1)^n x^{2n}}{(2n)!} + \dots$$

$$e^x \approx 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} + \dots + \frac{x^n}{n!} + \dots$$

$$= \sum_{n=0}^{\infty} \frac{x^n}{n!}$$