AP Calculus BC – Midterm Review Warm-up #7

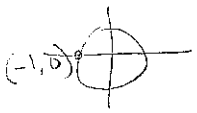
Name: Answer Key*

1) Write a power series that is centered at -2 for the function

$$f(x) = \frac{3}{2x-5}$$

$$\frac{3}{-5+2x} \rightarrow \frac{3}{-5+2(x+2)-4} = \frac{3}{-9+2(x+2)} = \frac{-3/9}{1+\frac{2(x+2)}{-9}} \qquad a = -1/3 \qquad r = \frac{2(x+2)}{9}$$

$$\sum_{n=0}^{\infty} \left(-\frac{1}{3}\right)\left(\frac{2(x+2)}{9}\right)^n$$



2) Find the fourth term of the Taylor Polynomial for f(x) = sinx, centered at x = π.

$f(x) = \sin x \rightarrow \sin\pi = 0$
$f'(x) = \cos x \rightarrow \cos\pi = -1$
$f''(x) = -\sin x \rightarrow -\sin\pi = 0$
$f'''(x) = -\cos x \rightarrow -\cos\pi = 1$
$f^4(x) = \sin x \rightarrow \sin\pi = 0$
$f^5(x) = \cos x \rightarrow \cos\pi = -1$
$f^6(x) = -\sin x = -\sin\pi = 0$
$f^7(x) = -\cos x = -\cos\pi = 1$

$$P_7(x) = \cancel{0} + -1(x-\pi) + 0\frac{(x-\pi)^2}{\cancel{2!}} + 1\frac{(x-\pi)^3}{3!} + \cancel{0\frac{(x-\pi)^4}{4!}} - 1\frac{(x-\pi)^5}{5!} + \cancel{0\frac{(x-\pi)^6}{6!}} + \frac{(x-\pi)^7}{7!}$$

3) Find $f'(x)$ $\int f(x)dx$ if

↑ and

$$f(x) = \sum_{n=1}^{\infty} \frac{(-1)^{n+1}(x-6)^n}{n6^n} \qquad \frac{1}{n6^n}(x-6)^n$$

$$f'(x) = \sum_{n=1}^{\infty} \frac{(-1)^{n+1}(x-6)^{n-1}}{6^n}$$

$$\int f(x)\,dx = \sum_{n=1}^{\infty} \frac{(-1)^{n+1}(x-6)^{n+1}}{n6^n(n+1)}$$