

Calc BC: Pg 5-2 GORAPP

①  $\sum_{n=0}^{\infty} \frac{\pi^n}{e^{2n}} = 1 + \frac{\pi}{e^2} + \frac{\pi^2}{e^4} + \dots$   $S_n = \frac{a}{1-r}$

$S_n = \frac{1}{1 - \frac{\pi}{e^2}} = \frac{e^2}{e^2 - \pi}$  (D)

②  $P_3(x) = 2 - \frac{x}{1!} + \frac{6x^2}{2!} + \frac{12x^3}{3!}$   
 $= 2 - x + 3x^2 + 2x^3$  (A)

③  $f(x) = \frac{1}{x}$   $f(1) = 1$

$f'(x) = -\frac{1}{x^2}$   $f'(1) = -1$

$P_n = 1 - \frac{1}{1!}(x-1) + \frac{2}{2!}(x-1)^2 - \frac{6}{3!}(x-1)^3 + \dots$

$f''(x) = \frac{2}{x^3}$   $f''(1) = 2$

$= \sum_{n=0}^{\infty} (-1)^n (x-1)^n$  (E)

$f'''(x) = -\frac{6}{x^4}$   $f'''(1) = -6$

④  $f(x) = \sum_{n=0}^{\infty} 2 \left(\frac{x+2}{3}\right)^n$

a)  $a=2$   $r = \frac{x+2}{3}$

a) converges iff  $|r| < 1$ ,

$r = \frac{x+2}{3}$

$x+2 < 3 \iff x+2 > -3$   
 $x < 1 \iff x > -5$

$|\frac{x+2}{3}| < 1$

$|x+2| < 3$

$-5 < x < 1$

b)

$S_n = \frac{2}{1 - \frac{x+2}{3}}$

$= \frac{6}{3 - (x+2)}$

$S_n = \frac{6}{1-x}$