Самостоятельная работа Гревцов Артем
ИВМ 2.1

№2

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

$$U_k = (-1)^k \cdot \frac{x^{2k+1}}{(2k+1)!}$$

$$M = \frac{U_k}{U_{k-1}} = \frac{(-1)^k \cdot \frac{x^{2k+1}}{(2k+1)!}}{(-1)^{k-1} \cdot \frac{x^{2(k-1)+1}}{(2(k-1)+1)!}} = \frac{(-1)\cdot(-1)^{k-1} \cdot \frac{x^{2k+1}}{(2k+1)!}}{(-1)^{k-1} \cdot \frac{x^{2(k-1)+1}}{(2(k-1)+1)!}} =$$

$$= (-1) \cdot \frac{x^{2k+1} \cdot (2(k-1)+1)!}{(2k+1)! \cdot x^{2(k-1)+1}} = (-1) \cdot \frac{x^{2k} \cdot x \cdot (2(k-1)+1)!}{(2k+1)! \cdot x^{2(k-1)} \cdot x} =$$

$$= (-1) \cdot \frac{\cancel{x^{2k}} \cdot (2(k-1)+1)!}{(2k+1)! \cdot \cancel{x^{2k}} \cdot \frac{1}{x^2}} = (-1) \frac{x^2 (2k-1)!}{(2k+1)!} =$$

$$= (-1) \cdot \frac{x^2 \cdot \cancel{(2k-1)!}}{2k \cdot (2k+1) \cancel{(2k-1)!}} = (-1) \frac{x^2}{4k^2+2k}$$

$$\underline{M} = -\frac{x^2}{4k^2+2k}$$

№3

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

$$U_k = (-1)^k \cdot \frac{x^{2k}}{(2k)!}$$

$$M = \frac{U_k}{U_{k-1}} = \frac{(-1)^k \frac{x^{2k}}{(2k)!}}{(-1)^{k-1} \cdot \frac{x^{2(k-1)}}{(2(k-1))!}} = \frac{(-1) \cdot (-1)^{k-1} \frac{x^{2k}}{(2k)!}}{(-1)^{k-1} \frac{x^{2(k-1)}}{(2(k-1))!}} =$$

$$= (-1) \frac{x^{2k} \cdot (2(k-1))!}{(2k)! \, x^{2(k-1)}} = (-1) \frac{x^{2k} \cdot (2(k-1))!}{(2k)! \cdot x^{2k} \cdot \frac{1}{x^2}} =$$

$$= (-1)\frac{x^2 (2k-2)!}{(2k)!} = (-1)\frac{x^2 \cdot (2k-2)!}{2k \cdot (2k-1) \cdot (2k-2)!} =$$

$$= -(1) \cdot \frac{x^2}{4k^2-2k}$$

$$\underline{M} = -\frac{x^2}{4k^2-2k}$$