

Approximation- Supplement Solution Set

See If You Need This Video!

1. Answer: B.

The order of approximation is the largest index of the expression.

For example, we are approximating around $x = 0$,

The order of approximation is the largest index of x in the series.

$$\frac{1}{1-x} \approx 1 + x + x^2 + x^3$$

In this question is thus 3.

«Jargon of approximation»

Cantonese: 2:26 English: 1:53 Putonghua: 2:25

2. Answer: D.

The order of error is the $O(x^{n+1})$, where n is the order of approximation.

«Jargon of approximation»

Cantonese: 2:26 English: 1:53 Putonghua: 2:25

3. Answer: D.

Please note that we are expanding the series about a point $x = x'$.

It should be a power series of $(x - x')$.

«Introduction of Taylor series»

Cantonese: 3:25 English: 2:32 Putonghua: 3:21

4. Answer: A.

As the Taylor series is a power series of $(x - x')$, $|x - x'| < 1$ for convergence.

Please be noted that when $|x - x'| = 1$, the series diverges.

(Magnitude of $(x - x')^n$ never decays, all the terms at the tail may be significant).

《Range of convergence》

Cantonese: 5:16 English: 4:06 Putonghua: 5:12

5. Answer: B.

We just multiply the two series and keep terms up to 3rd order.

Of course, consider what terms should be multiplied before you write.

(Obviously, the order of $\frac{x^4}{24}$ in $f_1(x)$ is too high, we won't even consider it in the process.)

《Combining two approximation》

Cantonese: 8:10 English: 6:50 Putonghua: 8:10