

$$\lim_{n \rightarrow \infty} \frac{\epsilon n^2 - \sqrt{n \epsilon^2}}{\epsilon n^2 - \sqrt{n \epsilon^2}} \stackrel{Hop}{\sim} \frac{1n - \sqrt{1}}{1+n-1} = \left(\frac{1}{2}\right) \checkmark$$

(1) (2)

$$\lim_{n \rightarrow \infty} \frac{|\sqrt{n-1}| - |\sqrt{n+1}|}{n} \rightsquigarrow \frac{-\sqrt{n+1} - \sqrt{n-1}}{n} \rightsquigarrow \frac{-2\sqrt{n}}{n} = \left(\frac{-2}{\sqrt{n}}\right) \checkmark$$

(1) (2)

$$\lim_{n \rightarrow \infty} \frac{n - \epsilon}{\sqrt{n - \epsilon}} \stackrel{Hop}{\sim} \frac{1}{\frac{1}{\sqrt{n}}} = \epsilon \checkmark$$

(1) (2)

$$\lim_{n \rightarrow \infty} \frac{n - \sqrt{\epsilon n}}{\epsilon n^2 - n - \epsilon} \stackrel{Hop}{\sim} \frac{1 - \frac{\sqrt{\epsilon}}{\sqrt{n}}}{\epsilon n - 1} \rightsquigarrow \frac{1}{\sqrt{\epsilon}} \left(\frac{1}{\sqrt{\epsilon}}\right) \checkmark$$

(1) (2)

$$\lim_{n \rightarrow \infty} \frac{1 - \sqrt{n}}{\sqrt{n} - \sqrt{\epsilon n}} \stackrel{Hop}{\sim} \frac{\frac{-1}{\sqrt{n}}}{\frac{1}{\sqrt{\epsilon n}}} \rightsquigarrow \frac{-\frac{1}{\sqrt{n}}}{\frac{1}{\sqrt{\epsilon n}}} = \left(-\frac{\sqrt{\epsilon}}{\sqrt{n}}\right) \checkmark$$

(1) (2)

$$\lim_{n \rightarrow \infty} \frac{\sqrt{n \epsilon} - \epsilon}{\sqrt{\epsilon n \epsilon} - \epsilon} \stackrel{Hop}{\sim} \frac{\frac{\sqrt{\epsilon}}{\sqrt{n}}}{\frac{\sqrt{\epsilon}}{\sqrt{\epsilon n}} - \epsilon} \rightsquigarrow \frac{\frac{\sqrt{\epsilon}}{\sqrt{n}}}{\frac{\sqrt{\epsilon}}{\sqrt{\epsilon n}} - \epsilon} = \left(\frac{1}{\sqrt{\epsilon}}\right) \checkmark$$

(1) (2)

$$\lim_{n \rightarrow \infty} \frac{\sqrt{n \epsilon} - \epsilon}{\sqrt{n} - 1} \stackrel{Hop}{\sim} \frac{\frac{\sqrt{\epsilon}}{\sqrt{n}}}{\frac{1}{\sqrt{n}} - 1} \rightsquigarrow \frac{\frac{\sqrt{\epsilon}}{\sqrt{n}}}{\frac{1}{\sqrt{n}} - 1} = \left(\frac{\sqrt{\epsilon}}{1 - \sqrt{n}}\right) \checkmark$$

(1) (2)

$$\lim_{n \rightarrow \pi} \frac{1 - \cos^n n}{\sin^n n} \Rightarrow \frac{(1 - \cos n)(\cos^n n - \cos n + 1)}{(1 - \cos^n n)(1 - \cos n)}$$

(2) (1)

→ $\frac{1}{1}$ ✓

$$\lim_{n \rightarrow \frac{\pi}{2}} \frac{1 - \tan n}{\sin n - \cos n} = \frac{\cos n - \cancel{\sin n}}{\cancel{\sin n} - \cos n} = \frac{-1}{\frac{1}{2}} = \frac{-1}{\frac{1}{2}} = -2$$

(2) (9)

→ -2 ✓

$$\lim_{n \rightarrow \frac{\pi}{2}} \frac{\tan^n n - 1}{\cos^n n} = \frac{\cancel{\sin^n n} - \cos^n n}{\cos^n n} = \frac{-1}{\cancel{\cos^n n} / \cancel{\sin^n n}} = \frac{-1}{\cos^n n} = -1$$

(2) (1)

→ -1 ✓