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(1) $f(x) = x^2 - x - 2$ , $f(1) = -2$ , $f(3) = 4$   $[1, 3] \rightarrow$ Interval (root)

$\therefore f'(x) = 2x - 1$ . $\therefore$ $x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$

$= x_n - \frac{x_n^2 - x_n - 2}{2x_n - 1}$

$= \frac{2x_n^2 - x_n - x_n^2 + x_n + 2}{2x_n - 1}$

$= \frac{x_n^2 + 2}{2x_n - 1}$

| $x_n$ | $x_{n+1}$ |
|---|---|
| 1 | 3 |
| 3 | 2.2 |
| 2.2 | 2.0 |
| 2.0 | 2.0 |

Hence, the root of the equation $f(x) = x^2 - x - 2$ is 2.0

(2) $f(x) = \cos(x)\cosh(x) + 1$ , $f'(x) = \cos(x)\sinh(x) - \sin(x)\cosh(x)$.

$[1.8, 1.9] \rightarrow$ Interval of roots.

$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$

$= x_n - \frac{\cos(x_n)\cosh(x_n) + 1}{\cos(x_n)\sinh(x_n) - \sin(x_n)\cosh(x_n)}$

$= \frac{x_n\cos(x_n)\sinh(x_n) - x_n\sin(x_n)\cosh(x_n) - \cos(x_n)\cosh(x_n) - 1}{\cos(x_n)\sinh(x_n) - \sin(x_n)\cosh(x_n)}$.

| $x_n$ | $x_{n+1}$ |
|---|---|
| 1.8 | 0.35 |
| 0.35 | -1.93 |

Hence, the root of the equation is 1.8

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