1.

```
Finite-difference solution (h = k = 0.10\pi \approx 0.314)
y\x 0.00π 0.10π 0.20π 0.30π 0.40π 0.50π 0.50π 0.50π 0.70π 0.50π 0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1.00π
                                      0.9511
0.8090
                                                                                                                                                                                                                                                                                                                                                  -0.4243
-0.5112
                                                                                                                                                                                               0.1326
                                                                                                                                                                                                                                                -0.0869
0.20\pi
                                                                                             0.5646
                                                                                                                                               0.3476
                                                                                                                                                                                                                                                                                                 -0.3056
                                                                                                                                                                                                                                                                                                                                                                                                    -0.6862
                                                                                                                                                                                                                                                                                                                                                                                                                                                      -0.8099
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       -0.8589
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         -0.8090
                                     0.5878
                                                                                           0.3681
                                                                                                                                               0.1763
                                                                                                                                                                                             -0.0050
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         -0.5878
                                                                                                                                                                                                                                                                                                 -0.3539
                                                                                                                                                                                                                                                                                                                                                   -0.5116
                                                                                                                                                                                                                                                                                                                                                                                                                                                      -0.7244
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       -0.7255
0.30π
                                                                                                                                                                                                                                                -0.1823
                                                                                                                                                                                                                                                                                                                                                                                                    -0.6420
                                     0.3090
0.0000
                                                                                                                                                                                                                                                                                                                                                                                                    -0.4413
                                                                                                                                                                                                                                                                                                                                                                                                                                                      -0.4863
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       -0.4679
0.40π
                                                                                            0.1728
                                                                                                                                                0.0531
                                                                                                                                                                                             -0.0589
                                                                                                                                                                                                                                                -0.1667
                                                                                                                                                                                                                                                                                                 -0.2699
                                                                                                                                                                                                                                                                                                                                                   -0.3642
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         -0.3090
0.50π
                                                                                            0.0000
                                                                                                                                                0.0000
                                                                                                                                                                                                0.0000
                                                                                                                                                                                                                                                  0.0000
                                                                                                                                                                                                                                                                                                    0.0000
                                                                                                                                                                                                                                                                                                                                                     0.0000
                                                                                                                                                                                                                                                                                                                                                                                                       0.0000
                                                                                                                                                                                                                                                                                                                                                                                                                                                        0.0000
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        0.0000
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         -0.0000
```

2.

Tempe	erature profile at	t = 10 s	
r	Forward(dt=0.01)	Backward(dt=0.5)	Crank-Nicolson
0.50	230.66	202.37	216.14
0.60	299.85	263.09	280.98
0.70	358.97	322.63	340.01
0.80	410.87	377.82	393.60
0.90	457.45	429.98	444.09
1.00	500.00	500.00	500.00

3.

```
Converged in 2898 iterations (max \Delta = 9.96e-07)
\nθ = π/6 (約 30°) 截面温度:
r = 0.50 \quad T \approx 50.00
r = 0.51 T ≈
             49.85
              49.73
r = 0.53 T ≈
r = 0.54
              49.66
r = 0.55
              49.64
r = 0.56
              49.70
r = 0.57
              49.84
r = 0.59
              50.08
r = 0.60 T ≈
              50.41
r = 0.61 T ≈
              50.84
r = 0.62 T ≈ 51.37
r = 0.64
        T ≈ 52.01
r = 0.65 T ≈ 52.75
r = 0.66 T ≈ 53.59
r = 0.68 T ≈ 54.54
r = 0.69 T ≈ 55.58
r = 0.70 T ≈ 56.71
r = 0.71 T ≈ 57.94
r = 0.72 T ≈ 59.25
r = 0.74
              60.64
              62.11
r = 0.75 T ≈
r = 0.76 T ≈
              63.66
              65.27
r = 0.78 T ≈
r = 0.79 T ≈
              66.95
r = 0.80 T ≈
              68.69
              70.47
r = 0.81 T ≈
r = 0.82 T \approx 72.31
r = 0.84
                Τ ≈
                        74.18
                        76.10
r = 0.85
               Τ ≈
                        78.04
r = 0.86
               Τ ≈
r = 0.88
               Τ ≈
                        80.01
               Τ ≈
r = 0.89
                        82.00
```

```
r = 0.90
           T≈
                  84.01
r = 0.91
           Τ ≈
                  86.02
           Τ ≈
                  88.04
r = 0.93
r = 0.94
           Τ ≈
                  90.06
r = 0.95
           T ≈
                 92.07
r = 0.96
           Τ ≈
                  94.08
r = 0.98
           T ≈
                  96.07
r = 0.99
           T≈
                  98.05
r = 1.00
           T ≈
                 100.00
```

х	t=0.0 t	=0.1 t=0.	2 t=0.3 t	=0.4 t=0.5	5 t=0.6 t	=0.7 t=0.8	8 t=0.9 t	=1.0 t=1.	1			
x= 0.0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
x= 0.1	0.8090	1.0238	1.0385	1.0385	1.0238	1.0000	0.9762	0.9615	0.9615	0.9762	2.1910	2.7148
x = 0.2	0.3090	0.8476	1.0624	1.0624	1.0385	1.0000	0.9615	0.9376	0.9376	2.1524	2.6910	3.3476
x = 0.3	-0.3090	0.3476	0.8714	1.0624	1.0385	1.0000	0.9615	0.9376	2.1286	2.6524	3.3090	3.8476
x=0.4	-0.8090	-0.2852	0.3476	0.8476	1.0238	1.0000	0.9762	2.1524	2.6524	3.2852	3.8090	4.0238
x= 0.5	-1.0000	-0.8090	-0.3090	0.3090	0.8090	1.0000	2.1910	2.6910	3.3090	3.8090	4.0000	3.8090
x= 0.6	-0.8090	-1.0238	-0.8476	-0.3476	0.2852	2.0000	2.7148	3.3476	3.8476	4.0238	3.8090	3.2852
x = 0.7	-0.3090	-0.8476	-1.0624	-0.8714	0.8434	2.0000	3.1566	3.8714	4.0624	3.8476	3.3090	2.6524
x=0.8	0.3090	-0.3476	-0.8714	0.1286	0.8434	2.0000	3.1566	3.8714	3.8714	3.3476	2.6910	2.1524
x = 0.9	0.8090	0.2852	0.8434	0.8434	1.2852	2.0000	2.7148	3.1566	3.1566	2.7148	2.1910	1.9762
x=1.0	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000