1. The Wave Equation Finite-Difference Algorithm gives the following results.

i	j	x_i	t_j	w_{ij}	$u(x_i, t_j)$
2	4	0.25	1.0	−0.7071068	−0.7071068
3	4	0.50	1.0	−1.0000000	−1.0000000
4	4	0.75	1.0	−0.7071068	−0.7071068

2. The Wave Equation Finite-Difference Algorithm gives the following results.

i	j	x_i	t_j	w_{ij}	$u(x_i, t_i)$
2	4	0.125	0.5	0.48428862	0.47942554
3	4	0.250	0.5	0.00000000	0
4	4	0.375	0.5	−0.48428862	0.47942554

3. The Wave Equation Finite-Difference Algorithm with $h = \frac{\pi}{10}$ and $k = 0.05$ gives the following results.

i	j	x_i	t_j	w_{ij}	$u(x_i, t_j)$
2	10	$\pi/5$	0.5	0.5163933	0.5158301
5	10	$\pi/2$	0.5	0.8785407	0.8775826
8	10	$4\pi/5$	0.5	0.5163933	0.5158301

The Wave Equation Finite-Difference Algorithm with $h = \frac{\pi}{20}$ and $k = 0.1$ gives the following results.

i	j	x_i	t_j	w_{ij}
4	5	$\pi/5$	0.5	0.5159163
10	5	$\pi/2$	0.5	0.8777292
16	5	$4\pi/5$	0.5	0.5159163

The Wave Equation Finite-Difference Algorithm with $h = \frac{\pi}{20}$ and $k = 0.05$ gives the following results.

i	j	x_i	t_j	w_{ij}
4	10	$\pi/5$	0.5	0.5159602
10	10	$\pi/2$	0.5	0.8778039
16	10	$4\pi/5$	0.5	0.5159602

4. The Wave Equation Finite-Difference Algorithm gives the following results.

i	j	x_i	t_j	w_{ij}
2	10	0.62831853	0.5	0.5233857
5	10	1.57079633	0.5	0.8904370
8	10	2.51327412	0.5	0.5233857

For $h = 0.05$ and $k = 0.1$:

i	j	x_i	t_j	w_{ij}
4	5	0.62831853	0.5	0.53000146
10	5	1.57079633	0.5	0.90169234
16	5	2.51327412	0.5	0.53000146

For $h = 0.05$ and $k = 0.05$:

i	j	x_i	t_j	w_{ij}
4	10	0.62831853	0.5	0.52299419
10	10	1.57079633	0.5	0.88977086
16	10	2.51327412	0.5	0.52299419

5. The Wave Equation Finite-Difference Algorithm gives the following results.

i	j	x_i	t_j	w_{ij}	$u(x_i, t_j)$
2	3	0.2	0.3	0.6729902	0.61061587
5	3	0.5	0.3	0	0
8	3	0.8	0.3	−0.6729902	−0.61061587

6. Algorithm 12.4 gives the following results:

i	j	x_i	t_j	w_{ij}
2	5	0.2	0.5	−1
5	5	0.5	0.5	0
8	5	0.8	0.5	1

7. (a) The air pressure for the open pipe is $p(0.5, 0.5) \approx 0.9$ and $p(0.5, 1.0) \approx 2.7$.
   (b) The air pressure for the closed pipe is $p(0.5, 0.5) \approx 0.9$ and $p(0.5, 1.0) \approx 0.9187927$.

8. Approximate voltages and currents are given in the following table.

i	j	x_i	t_j	Voltage	Current
5	2	50	0.2	77.769	3.88845
12	2	120	0.2	104.60	−1.69931
18	2	180	0.2	33.986	−5.22995
5	5	50	0.5	77.702	3.88510
12	5	120	0.5	104.51	−1.69785
18	5	180	0.5	33.957	−5.22453