# 1.0 Phase I – Theory

## 1.8

*Determine the analytical value of Qa of Q.*

|  |  |  |
| --- | --- | --- |
|  | | (5) |
| **Result:** |  |  |
|  | (5 – I) |

This answer is the exact answer too equation (5)

## 1.9

*Determine the discrete value of Qd of Q.*

|  |  |  |
| --- | --- | --- |
|  | | (6) |
| **Result:** |  | (6 – I) |

This is not the exact value but an approximation of the true integral.

## 1.10

*A natural demand, resulting from a finite volume derivation of the discrete equations, is Qd = Qa. Verify that this implies that qmi must be chosen as the average of the values qm on the left and right of the interface.*

|  |  |  |
| --- | --- | --- |
|  | | (7) |
| **Result:** |  | (7 – I) |
|  | (7 – II) |

Solving equation 7 – I it follows that . This proves the statement in the assignment