Name: Date:

Group members: Class:

**Estimating Storage Capacity Worksheet**

1. **Calculate d**

|  |  |
| --- | --- |
|  | * *d* is the spacing of the structure (here: track pitch) * *θ* is the angle of the *mth* diffracted ray * *m* is the *order* of the diffracted ray. Here we only use the first order, i.e. m=+1, -1 |

To get a better estimate for d, calculate the average  in the last column.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Laser color** | **Wavelength *(nm)*** | **Θ, m=+1** | **Θ,m=-1** | **d, m=+1** | **d, m=-1** |  |
| **CD** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **DVD** |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

1. **Estimate the storage**

Using your measured distance d between tracks, how many tracks fit on a disc if 33mm are writable?

A CD track has around 270,000 pits. A DVD track fits around 500,000 pits because the pits are smaller. How many pits fit on a CD and DVD?

Divide the number by 8 to get an estimate of the storage in bytes. Compare with the info on the CD/DVD. Note that the DVD has two layers.

1. **Blu-ray discs** need special readers that rely on blue lasers. How can a blu-ray disc store more information? Why is the laser blue?
2. What are two advantages of using digital media to store data? What is a disadvantage?