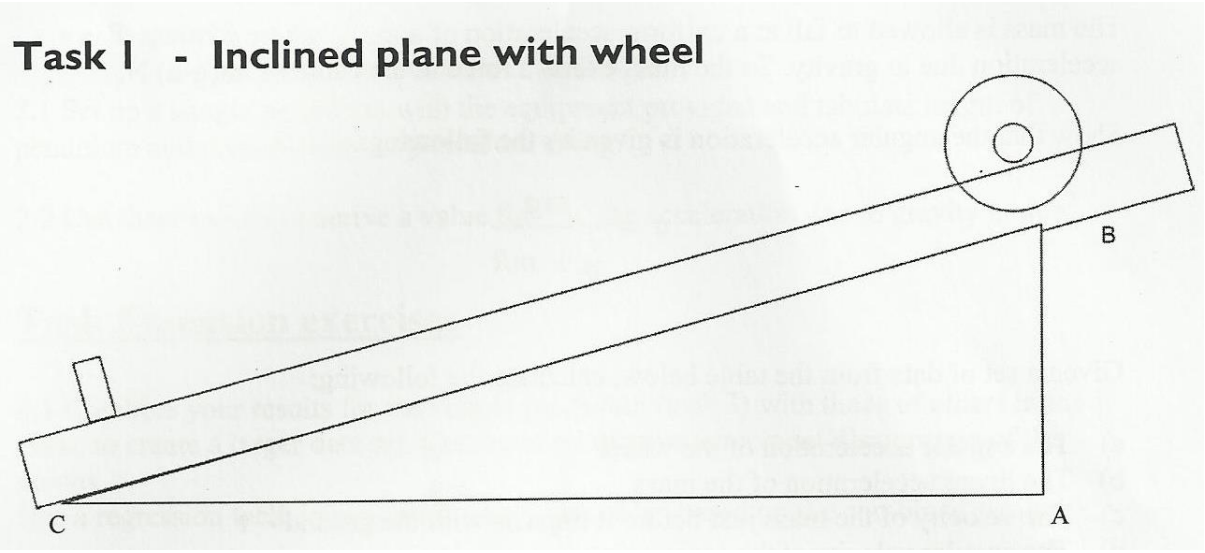
Task 1 - Inclined plane with wheel



- **Radius of Disc:** 750mm
- **Radius of Spindle:** 7.5mm

1.1. Using your knowledge of linear motion, calculate the values of the linear acceleration for 5 values of sin Θ, by measuring the time taken to reach the stops from initial rest point. [Cautionary note: the distance travelled is not the same as the length of the slope!!!]

Length (mm)	Height (mm)	sin Θ	Time (seconds)	Acceleration
850	55	0.064706	48.4	0.000726
850	65	0.076471	30.9	0.00178
850	75	0.088235	26.1	0.002496
850	85	0.1	22.65	0.003314
850	95	0.111765	19.2	0.004612

1.2. Identify a relationship between sin Θ and time from the results obtained above.

As shown in the results table above there is a relationship shown between sin Θ and the time, this is because as the sin Θ of the angle increases you can see a decrease in time, the way that we was setting up the inclined plane was causing the angle to change this was due to us varying the height. Each time we increased the height of our inclined plane this showed that the gradient of the slope increased, which in this case proves that as the gradient increases the time taken for the spindle to roll down decreases.

1.3. By applying your knowledge of conservation of energy in linear & angular motion systems show that;

$$\frac{\mathbf{g}\sin\theta}{(\mathbf{1}+\boldsymbol{k}/\boldsymbol{r}^2}$$

1.4. Using your results together with this formula, obtain a value for k, the radius of gyration disc. [Cautionary note: r is the radius of the spindle].