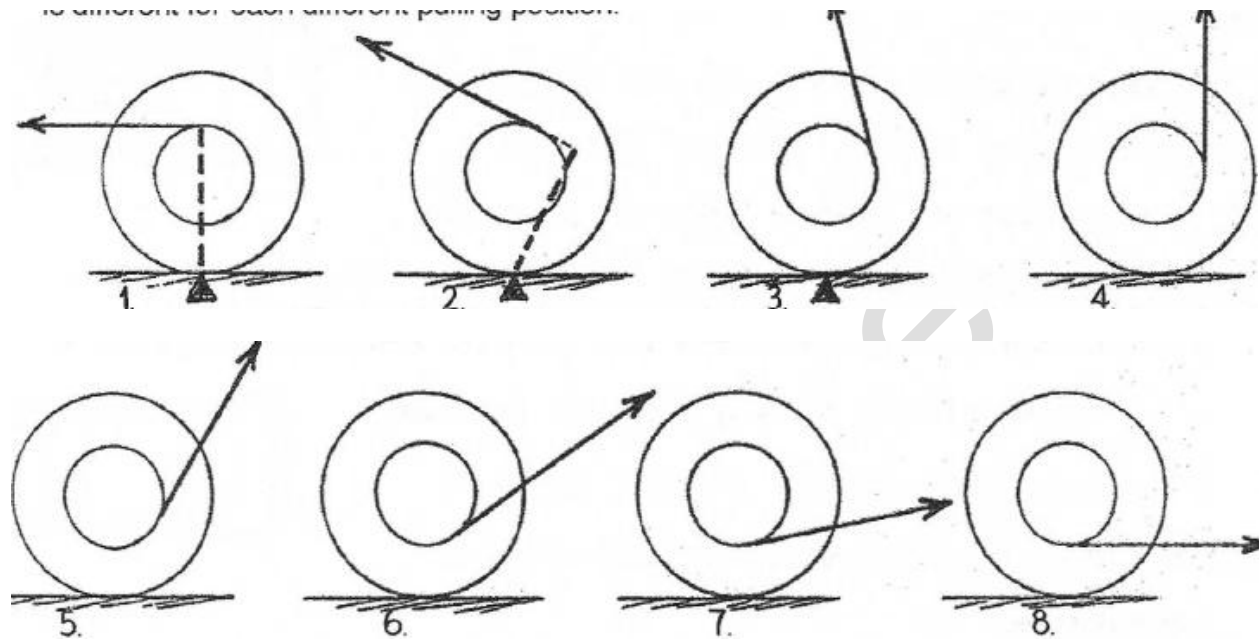


Torques and Rotation

Pull the string gently and the spool rolls. The direction of roll depends on the way the torque is applied. In figure, the force and lever arm are shown for the torque about the point where surface contact is made (shown by the triangular "fulcrum"). The lever arm is the heavy dashed line, which is different for each different pulling position.



- Construct the lever arm for the other positions.
- Lever arm is longer when the string of the spool spindle is on the [top] [bottom].
- For a given pull, the torque is greater when the string is on the [top] [bottom].
- For the same pull, rotational acceleration is greater when the string is on the [top] [bottom] [makes no difference].
- At which position(s) does the spool roll to the left?
- At which position(s) does the spool roll to the right?
- At which position(s) does the spool not roll at all?
- Why does the spool slide rather than roll at this position?