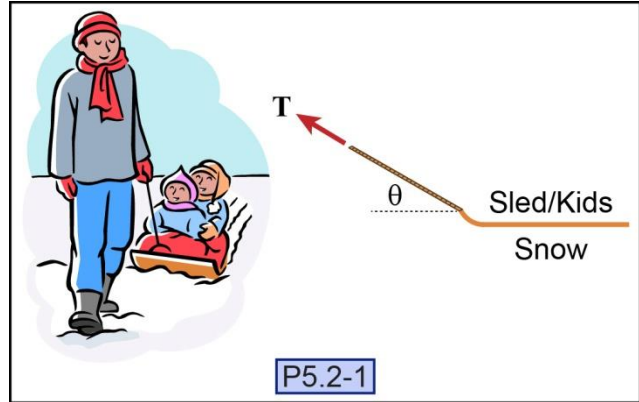**P5.2-1)** A father pulls his two kids on a sled with a force of $T = 100$ lb at an angle of θ. The combined weight of the sled and children is equal to 100 lb. What angle(s) does the father have to pull at for the sled to accelerate at 25 ft/s²? Estimate the friction characteristics as that between waxed wood and dry snow (see Appendix C for coefficient of friction values).

Given:

P5.2-1

Find:

Solution:

FBD

Draw a free-body diagram of the sled. Remember to include a coordinate system.

Friction force.

Determine the kinetic friction force between the snow and the sled as a function of θ.

$\mu_k =$ _____

$F_{fk} =$ _____

Equation of motion

Determine the non-linear equation that will be used to solve for the angle between the rope and the horizontal.

Equation of motion:

_____

Solve for the angle using a computing device or software.

$\theta =$ _____