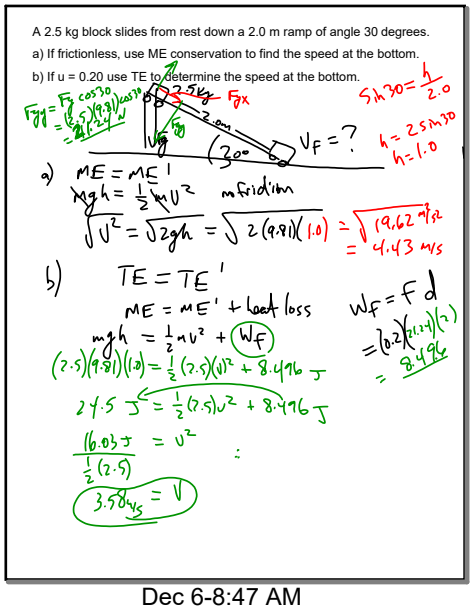
A 2.5 kg block slides from rest down a 2.0 m ramp of angle 30 degrees.
a) If frictionless, use ME conservation to find the speed at the bottom.
b) If u = 0.20 use TE to determine the speed at the bottom.
2.5kg
Fgx
Fgy = Fg cos30 cos30
= (2.5)(9.81)(cos30)(cos30)
= 21.2 N
Fg
2.0m
30°
VF = ?
sin30 = h/2.0
h = 2.5sin30
h = 1.0
a) ME = ME'
mgh = ½mv² mfriction
√v² = √2gh = √2(9.81)(1.0) = √19.62 m²/s²
= 4.43 m/s
b) TE = TE'
ME = ME' + heat loss
mgh = ½mv² + (WF)
(2.5)(9.81)(1.0) = ½(2.5)(v)² + 8.496 J
24.5 J = ½(2.5)v² + 8.496 J
16.03 J / ½(2.5) = v²
3.58 m/s = v
WF = Fd
= (0.2)(21.2)(2)
= 8.496

Dec 6-8:47 AM