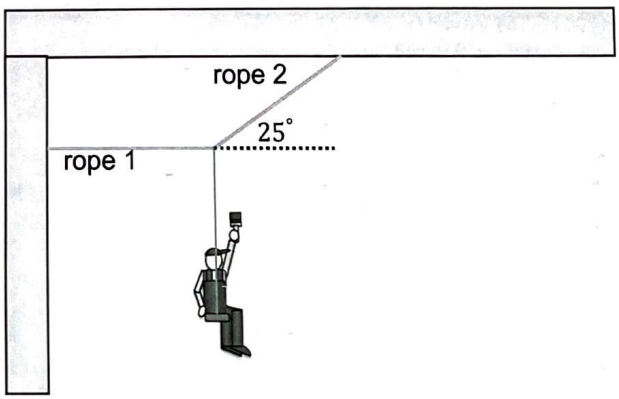
Cycle 4 - Advanced Components

Review

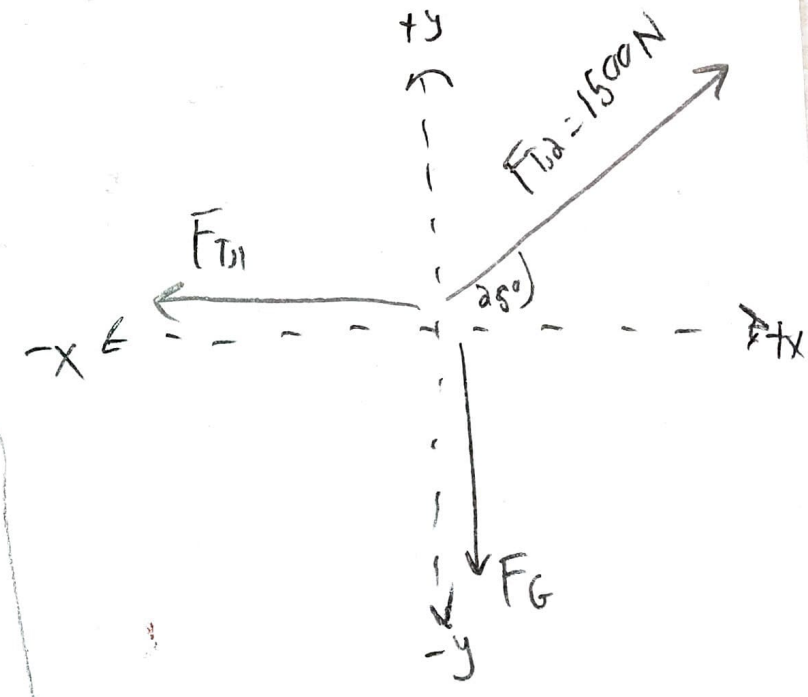
Name: _____

What is the Tension force on rope 1 if the Tension force on rope 2 is 1500N, and this person is not accelerating?



$F_{Net,x} = 0$

$F_{Net,y} = 0$



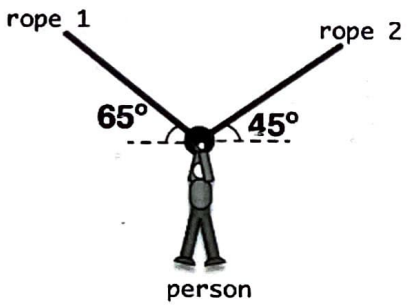
Forces	x	y
F_G	0	F_G
$F_{T,1}$	$F_{T,1}$	0
$F_{T,2}$	$(1500N)\cos(25) = +1359N$	$(1500N)\sin(25) = +634N$
F_{Net}	0	0

$y: F_G + 634N = 0$

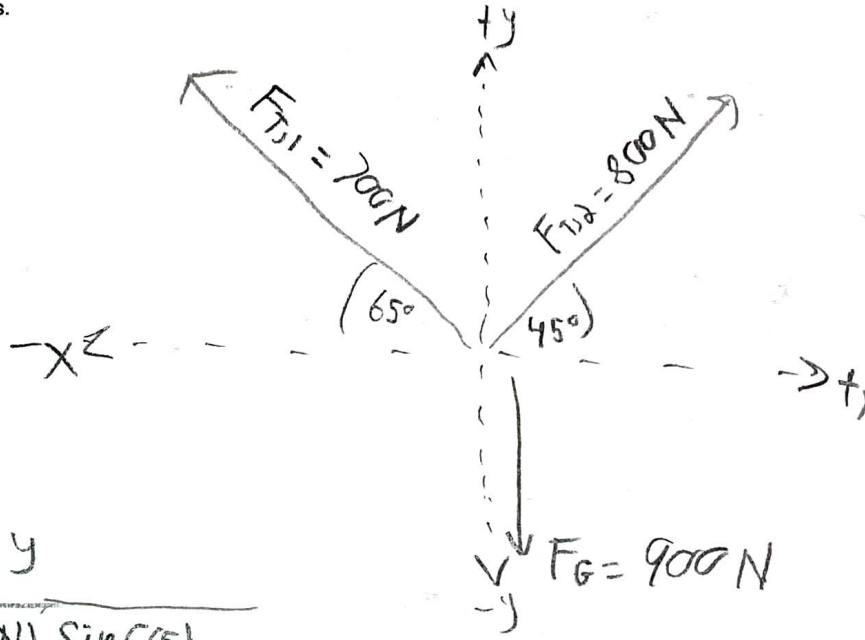
$F_G = -634\ N$

$X: F_{T,1} + 1359N = 0$

$F_{T,1} = -1359\ N$



The person starts at rest and is not touching the ground.
The tension in rope 1 is 700 N. The tension in rope 2 is 800 N. The person weighs 900 N, was at rest and is not touching the ground. Solve for the Net Forces.



Forces	X	y
$F_{T,1}$	$(700N)\cos(65) = -296N$	$(700N)\sin(65) = +634N$
$F_{T,2}$	$(800N)\cos(45) = +566N$	$(800N)\sin(45) = +566N$
F_G	0	$-900N$
F_{Net}	$F_{Net,x}$	$F_{Net,y}$

X: $(-296N) + (566N) = 270N$

$F_{Net,x} = 270N$

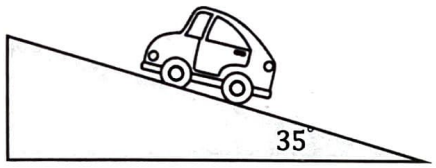
y: $(634N) + (566N) + (-900N) = 300N$

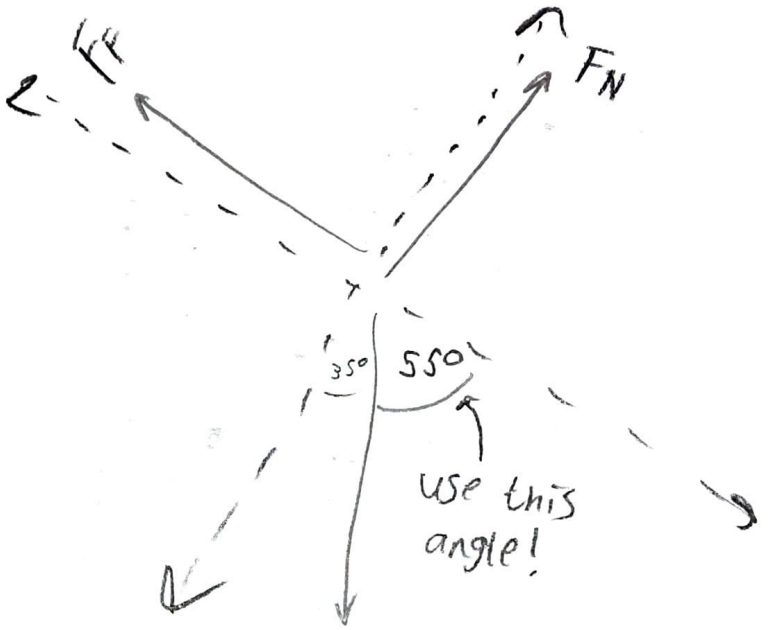
$F_{Net,y} = 300N$

$F_{Net,x} = 0$

$F_{Net,y} = 0$

What is the coefficient of friction if this 650 kg car **<u>is at rest and staying at rest</u>** on this incline?





$F_G = 6500\,N$

Forces	X	y
F_G	$(6500N)\cos(55) =$ $+3728\,N$	$(6500N)\sin(55) =$ $-5324\,N$
F_F	F_F	0
F_N	0	F_N
F_{Net}	0	0

$$\mu = \frac{F_F}{F_N} = \frac{3728N}{5324N}$$

$\mu = 0.7$

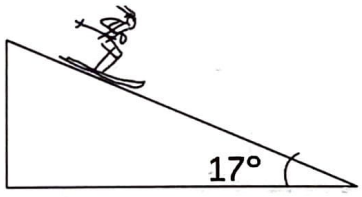
X:

$F_F + 3728N = 0$

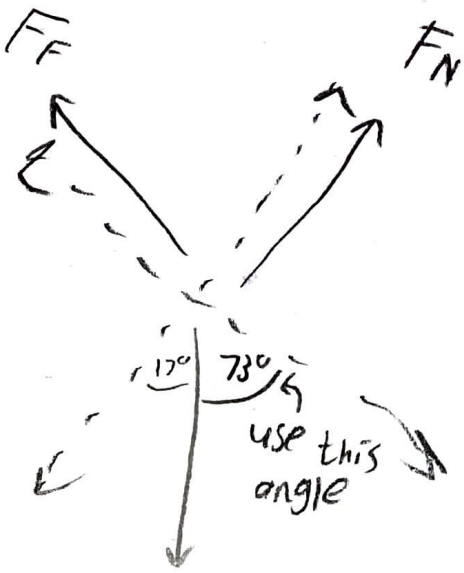
$F_F = -3728\,N$

$F_N + (-5324N) = 0$

$F_N = 5324\,N$



The 85 kg skier is **skiing down the hill.** The coefficient of friction is 0.15. Solve for the Normal Force and Friction, and the net forces.



Forces	x	y
F_G	$(850N)\cos(73)$ $+249N$	$(850N)\sin(73)$ $-813N$
F_N	0	F_N
F_F	F_F	0
F_{Net}	$F_{Net,x}$	0

$y: F_N + (-813N) = 0$

$F_N = 813N$

$F_F = (0.15)(813N)$

$F_F = -122N$

$F_{Net,x} = (+249N) + (-122N) = +127N$

$F_{Net,x} = +127N$