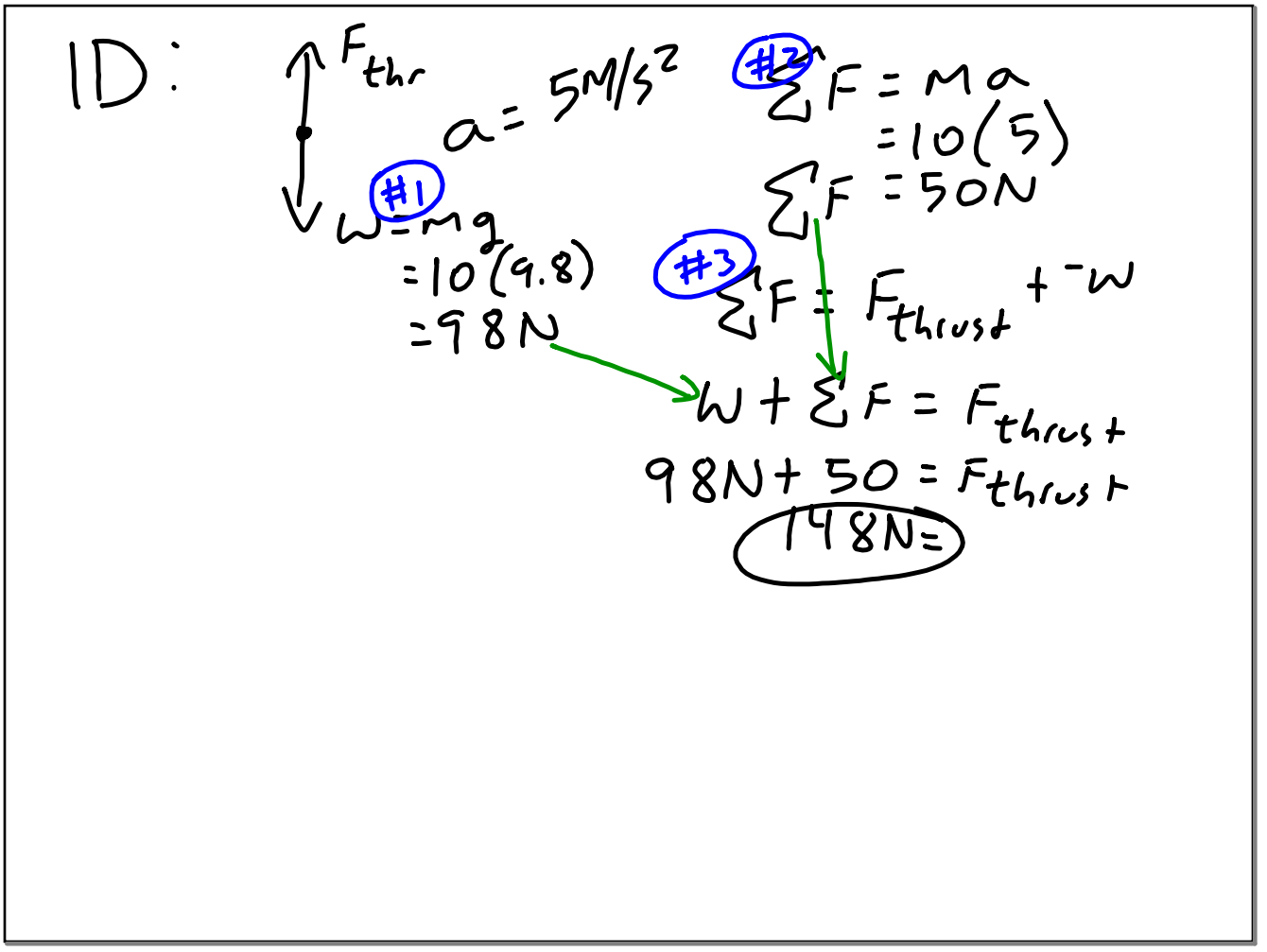
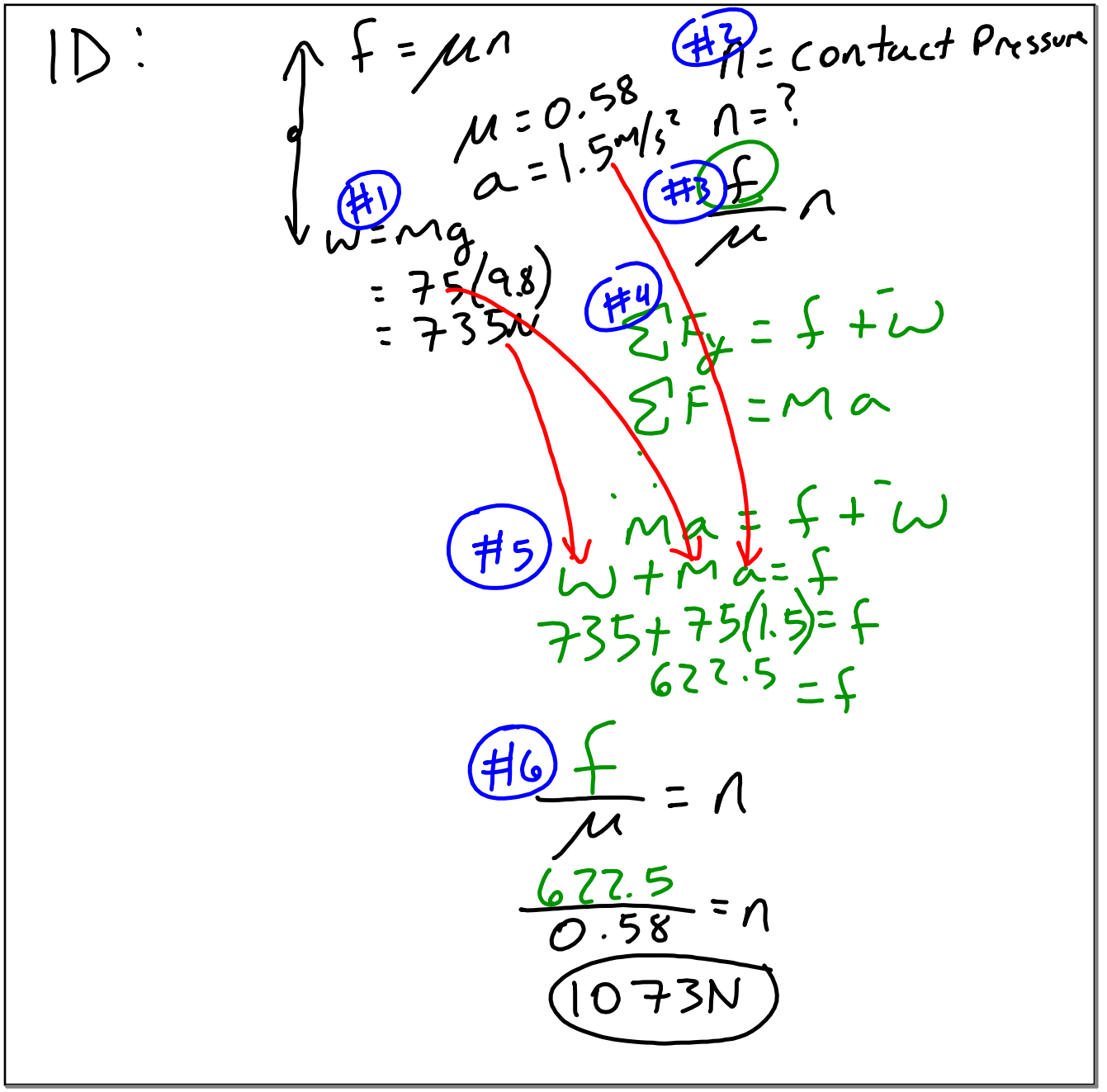
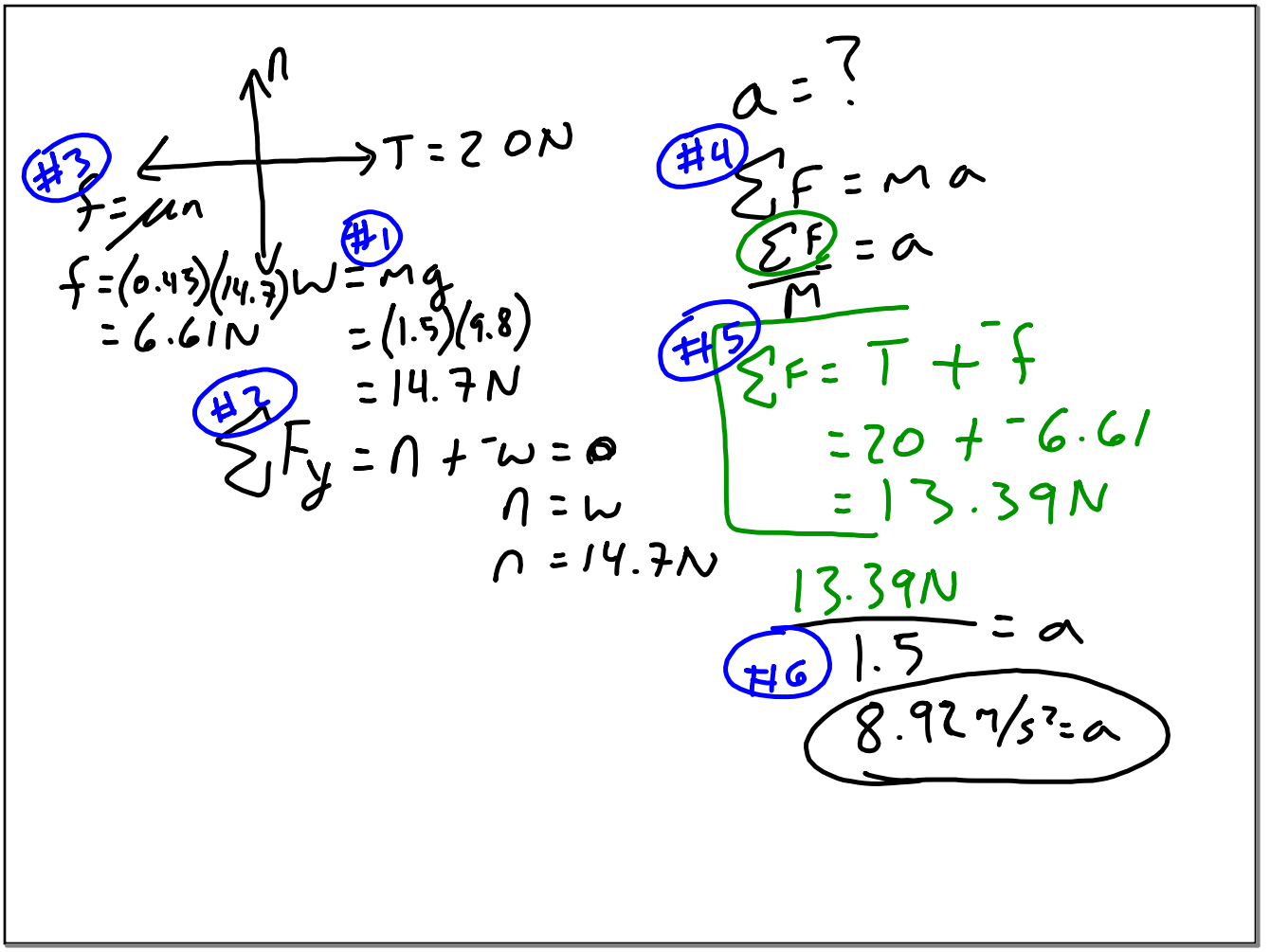
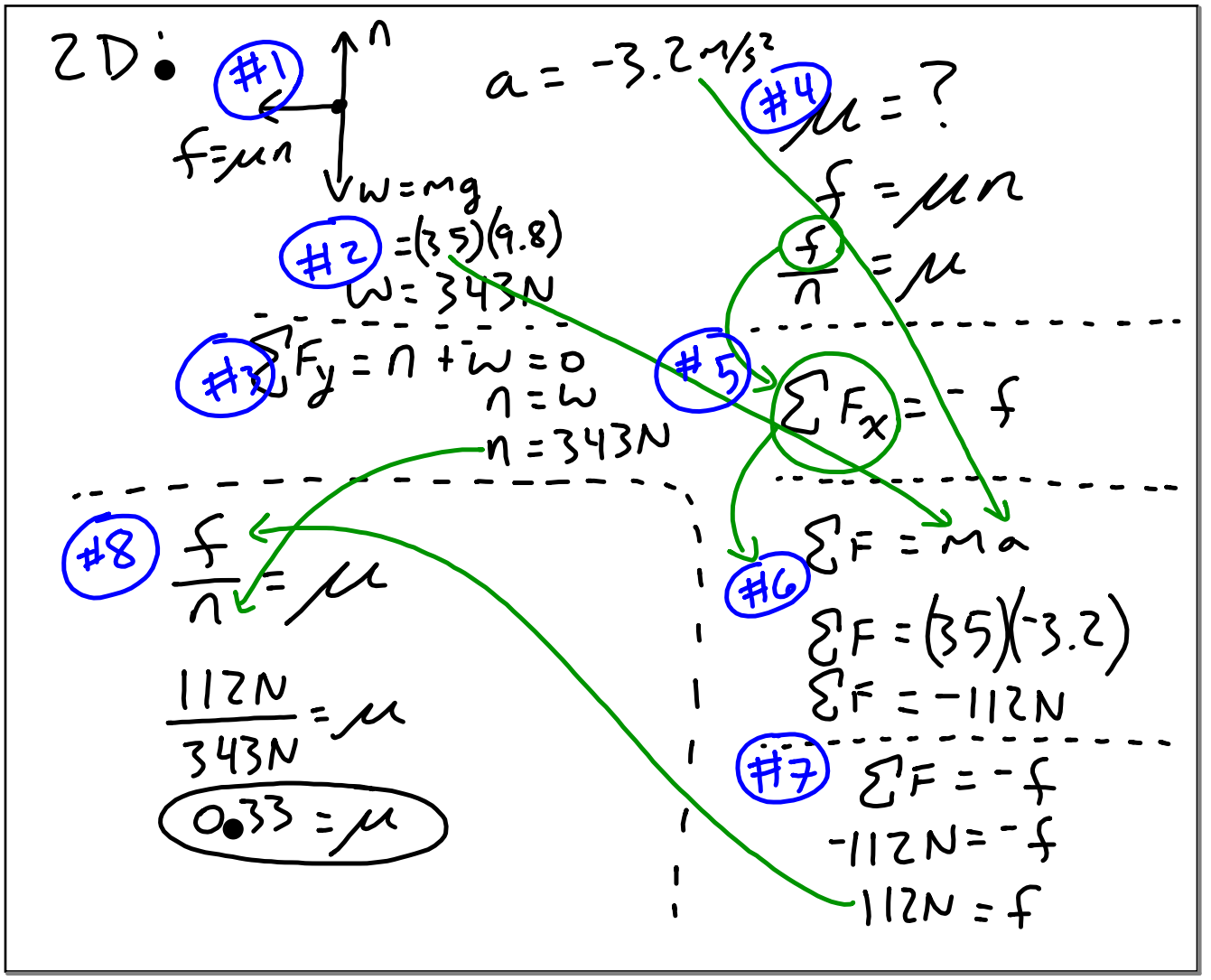
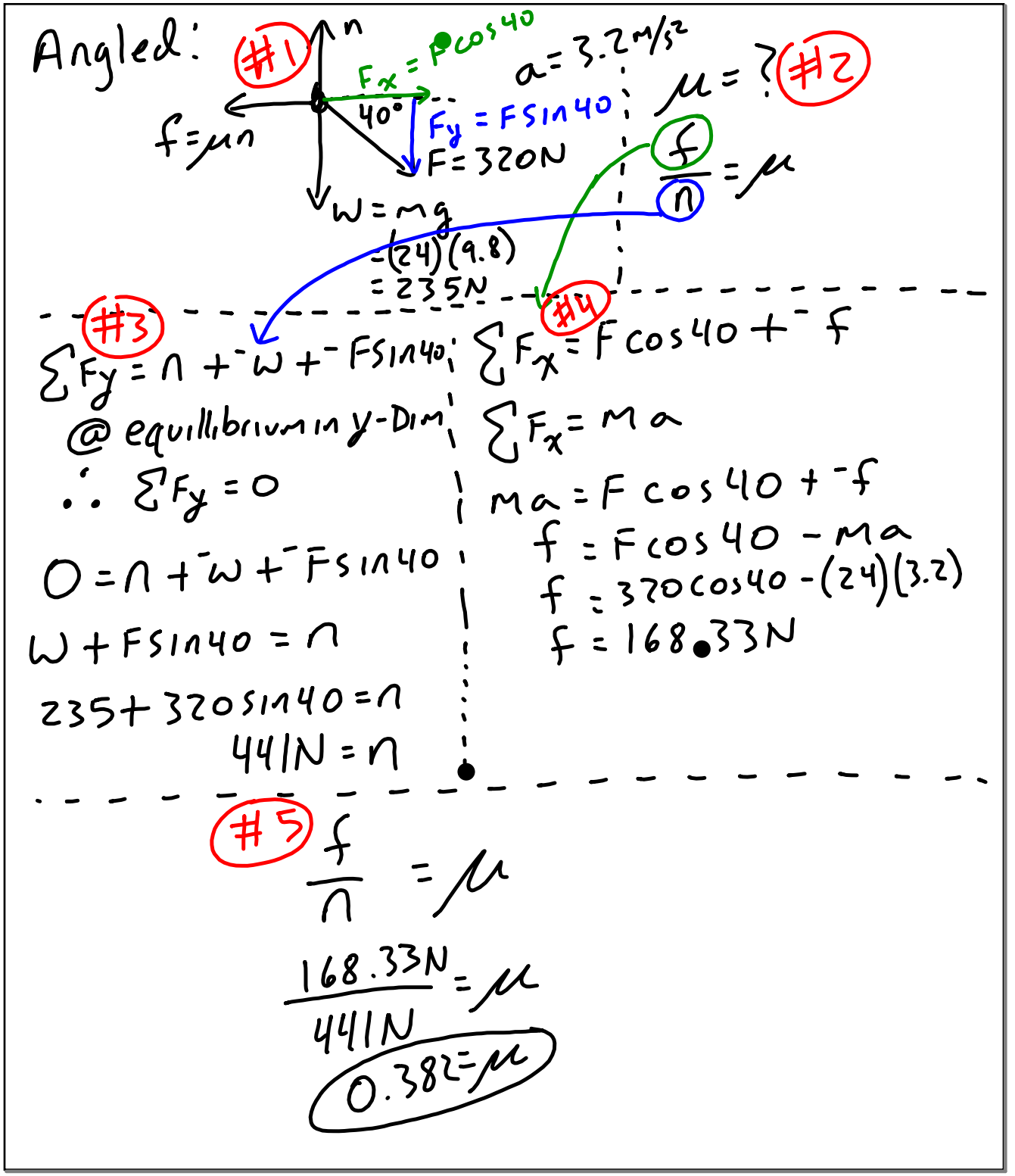
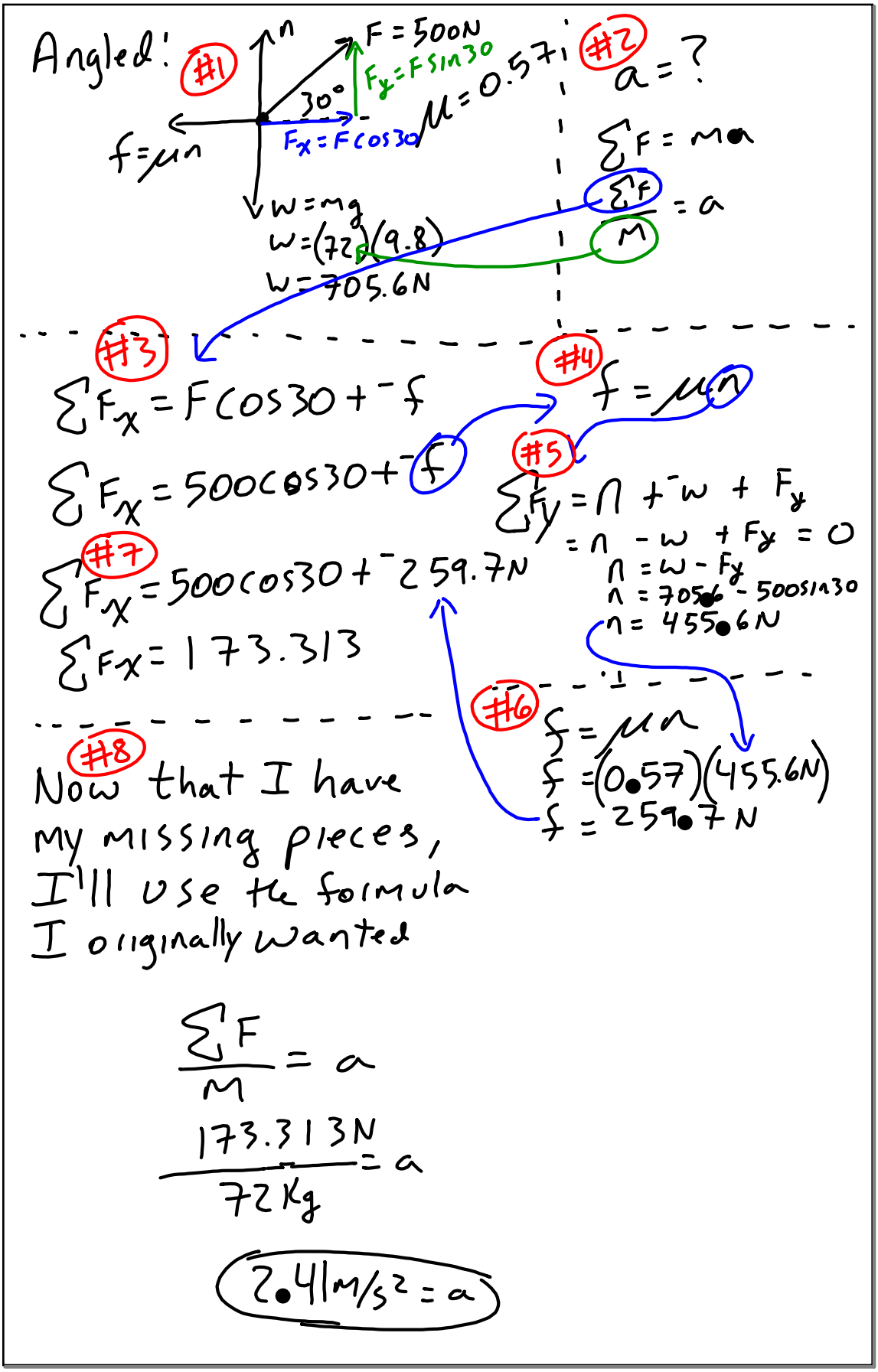

1D:
F_{thr}
$a = 5 M/s^2$
#2
$\sum F = ma$
$= 10(5)$
$\sum F = 50N$
#1
$W = mg$
$= 10(9.8)$
$= 98N$
#3
$\sum F = F_{thrust} + -W$
$W + \sum F = F_{thrust}$
$98N + 50 = F_{thrust}$
$148N =$


1D:
f = μn
#2 n = contact Pressure
μ = 0.58
a = 1.5 m/s²
n = ?
#1 w = mg
= 75(9.8)
= 735N
#3 f/μ = n
#4 ΣF_y = f + w
ΣF = ma
ma = f + w
#5 w + ma = f
735 + 75(1.5) = f
622.5 = f
#6 f/μ = n
622.5/0.58 = n
1073N

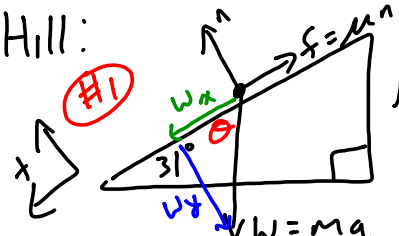

n
T = 20N
#3
f = μn
f = (0.43)(14.7)
= 6.61N
#1
w = mg
= (1.5)(9.8)
= 14.7N
#2
ΣF_y = n + -w = 0
n = w
n = 14.7N
a = ?
#4
ΣF = ma
ΣF / m = a
#5
ΣF = T + -f
= 20 + -6.61
= 13.39N
13.39N / 1.5 = a
#6
8.92 m/s² = a


2D:
#1
n
f=μn
w=mg
#2
=(35)(9.8)
w=343N
#3
ΣFy = n + w = 0
n = w
n = 343N
a = -3.2 m/s²
#4
μ = ?
f = μn
f/n = μ
#5
ΣFx = -f
#6
ΣF = ma
ΣF = (35)(-3.2)
ΣF = -112N
#7
ΣF = -f
-112N = -f
112N = f
#8
f/n = μ
112N/343N = μ
0.33 = μ


Angled:
#1
n
$F_x = F\cos 40$
40°
$F_y = F\sin 40$
F = 320N
f = μn
W = mg
= (24)(9.8)
= 235N
a = 3.2 m/s²
μ = ?
#2
f/n = μ
#3
$\sum F_y = n + -W + -F\sin 40$
@ equilibrium in y-Dim
$\therefore \sum F_y = 0$
$0 = n + -W + -F\sin 40$
$W + F\sin 40 = n$
$235 + 320\sin 40 = n$
$441N = n$
#4
$\sum F_x = F\cos 40 + -f$
$\sum F_x = ma$
$ma = F\cos 40 + -f$
$f = F\cos 40 - ma$
$f = 320\cos 40 - (24)(3.2)$
$f = 168.33N$
#5
$\frac{f}{n} = \mu$
$\frac{168.33N}{441N} = \mu$
$0.382 = \mu$


Angled!
#1
n
F = 500N
$F_y = F\sin 30$
30°
$F_x = F\cos 30$
$\mu = 0.57$
$f = \mu n$
w = mg
w = (72)(9.8)
w = 705.6N
#2
a = ?
$\sum F = ma$
$\frac{\sum F}{M} = a$
M
#3
$\sum F_x = F\cos 30 + -f$
$\sum F_x = 500\cos 30 + -f$
#4
$f = \mu n$
#5
$\sum F_y = n + -w + F_y$
$= n - w + F_y = 0$
$n = w - F_y$
$n = 705.6 - 500\sin 30$
$n = 455.6N$
#6
$f = \mu n$
$f = (0.57)(455.6N)$
$f = 259.7N$
#7
$\sum F_x = 500\cos 30 + -259.7N$
$\sum F_x = 173.313$
#8
Now that I have my missing pieces, I'll use the formula I originally wanted
$\frac{\sum F}{M} = a$
$\frac{173.313N}{72Kg} = a$
$2.41 m/s^2 = a$

Hill:



θ = 180 − 90 − 31
θ = 59°

$w_y = 607.6 \sin 59$
$w_x = 607.6 \cos 59$

W = (62)(9.8)
W = 607.6 N

#2 a = ?

$\sum F = ma$

$\frac{\sum F}{m} = a$

#3 find "f" ....
in order to find f I need "n", that means I need $\sum F_y$ first.

#4 $\sum F_y = n + -w_y$

@ equilibrium ∴

$\sum F_y = n + -607.6 \sin 59 = 0$

$n = 607.6 \sin 59$

$n = 520.815 N$

#5 Now that I have "n" and was given "μ", I can use $f = \mu n$.

$f = \mu n$

$f = (0.28)(520.815N)$

$f = 145.828N$

#6 Solve for $\sum F_x$ because that's the dir. we are accl. in.

$\sum F_x = -f + w_x$

$\sum F_x = -145.828 + 607.6 \cos 59$

$\sum F_x = -145.828 + 312.937 N$

$\sum F_x = 167.109$

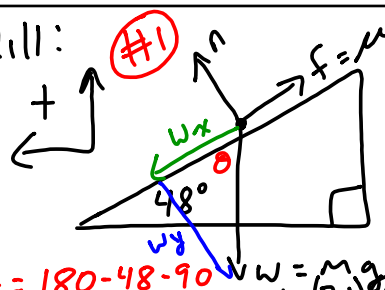
#7

$a = \frac{\sum F_x}{m}$

$a = \frac{167.109}{62}$

$a = 2.695 \, m/s^2$

Hill:



#2 $\mu = ?$

$\frac{f}{n} = \mu$

$\theta = 180 - 48 - 90$

$\theta = 42^\circ$

$W = mg$

$W = (71)(9.8)$

$W = 696\,N$

$W_x = 696 \cos 42$

$W_y = 696 \sin 42$

#3 $\sum F_y = n - W_y = 0$

$n = 696 \sin 42$

$n = 466\,N$

#4 $\sum F_x = ma$

$\sum F_x = (71)(4.6)$

$\sum F_x = 326.6\,N$

#5 $\sum F_x = W_x + -f = ma$

$f = 696 \cos 42 - 326.6\,N$

$f = 190\,N$

#6 $\mu = \frac{f}{n}$

$\mu = \frac{190\,N}{466\,N}$

$\mu = 0.408$