Physics 12 Unit 2 – Newton, Ff, Fg - Test

Name: _____   Date: _____

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1. A net force of 1200 N accelerates a bike and a rider at 3.6 m/s², what is the mass of the bike and rider together?

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$$F = ma \rightarrow m = \frac{F}{a} = \frac{1200}{3.6} \approx 333 \text{ Kg}$$

2. Calculate the acceleration of the block in the diagram below.

/6
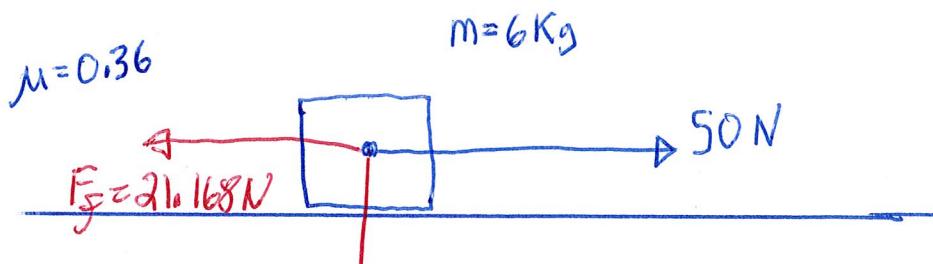
$m = 6 Kg$

$\mu = 0.36$

$F_f = 21.168 N$

$50 N$

$F_g = 58.8 N$

$F_N = 50 - 21.168$
$= 28.832$

$a = 4.81 m/s²$

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3. Calculate the acceleration of the block in the diagram below.

v₀

g

$\mu = 0.25$

$m = 4\,kg$

$F_{||}$

18.403 N

$F_f = 8.6527$

28°

$F_\perp$

28°

34.611 N

$F_g = 39.2\,N$
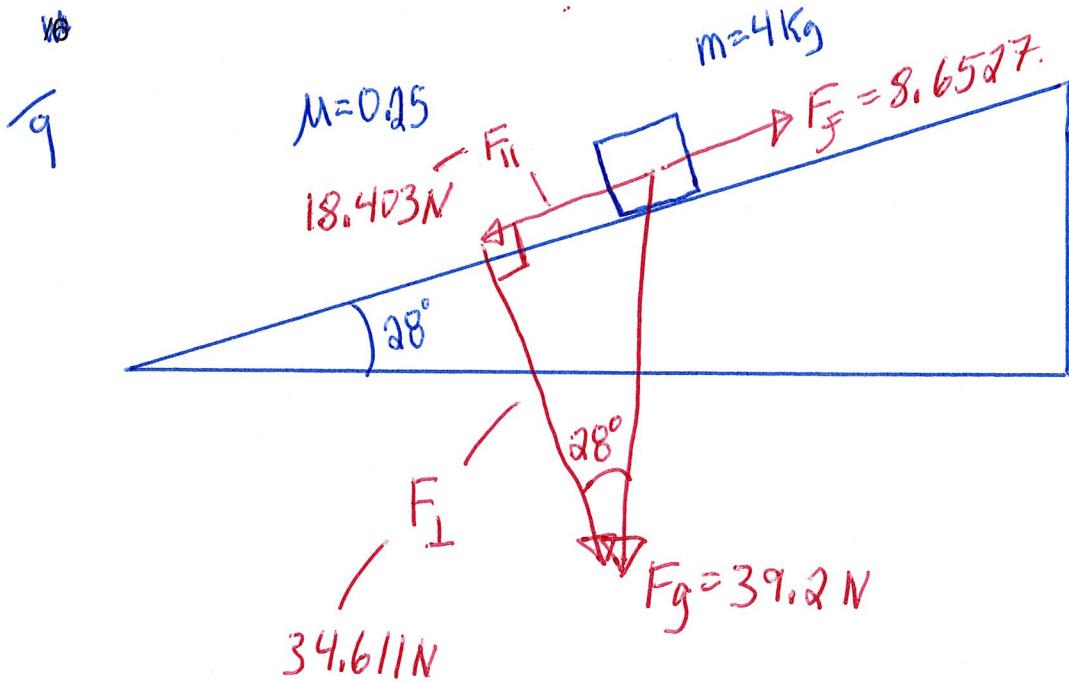
$$F_N = 18.403 - 8.6527$$

$$= 9.7502$$

$$a = \frac{F_N}{4} = 2.44\,m/s^2$$

4. Calculate the acceleration of the block in the diagram below.

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$m = 7 kg$

$\mu = 0.6$

$F_\perp = 6.796 N$

120 N

$F_F = 4.0776$

$31°$

$F_y = 61.804 N$

$F_x = 102.86 N$

$68.6 N = F_g$
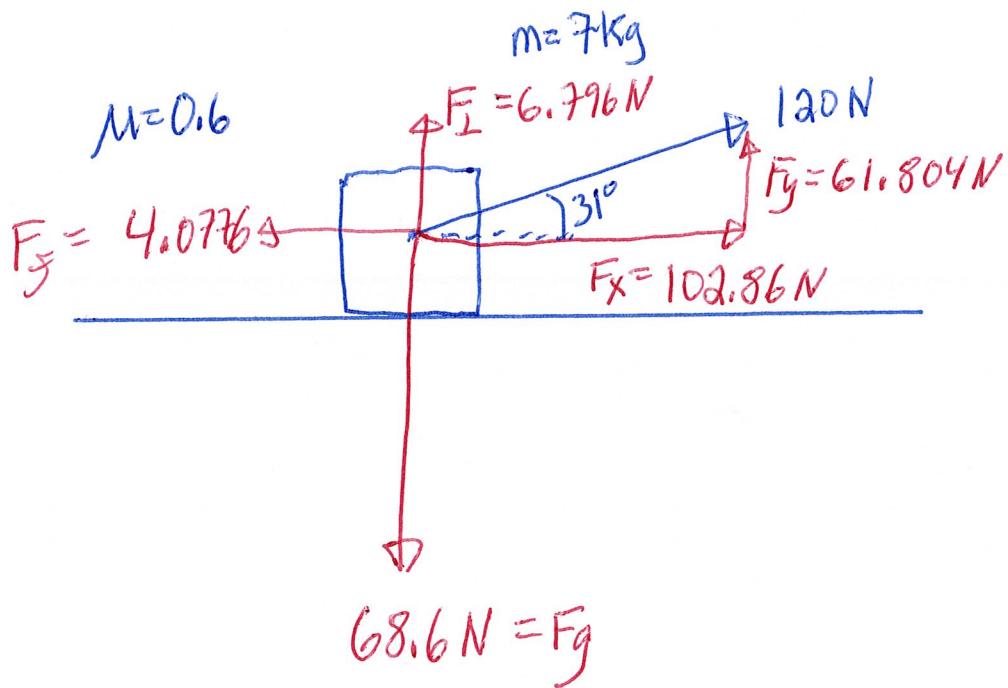
$F_N = 102.86 - 4.0776 = 98.782 N$

$a = \dfrac{F_N}{m} = 14.1 \, m/s^2.$

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5. Find the thrust required to accelerate a 905 kg rocket up at 23.4 m/s^2.

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Thrust = ?
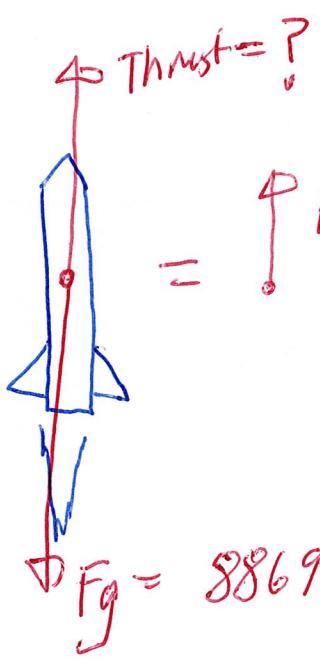
$$F_N = ma = (905)(23.4) = 21,177 N$$

$F_g = 8869 N$

$$F_N = Th - F_g$$

$$Th = F_N + F_g$$

$$Th = 30,046 N$$

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6. A 30 kg mass sits on a flat table and is attached to a 18 kg mass hanging over the edge of the table. Calculate the acceleration of the system and the tension in the cord.

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$\mu = 0.4$
$F_f = 117.6 N$

30 Kg

$F_g = 294 N$

18 Kg

176.4 N

on system

$F_N = 176.4 - 117.6 = 58.8 N$
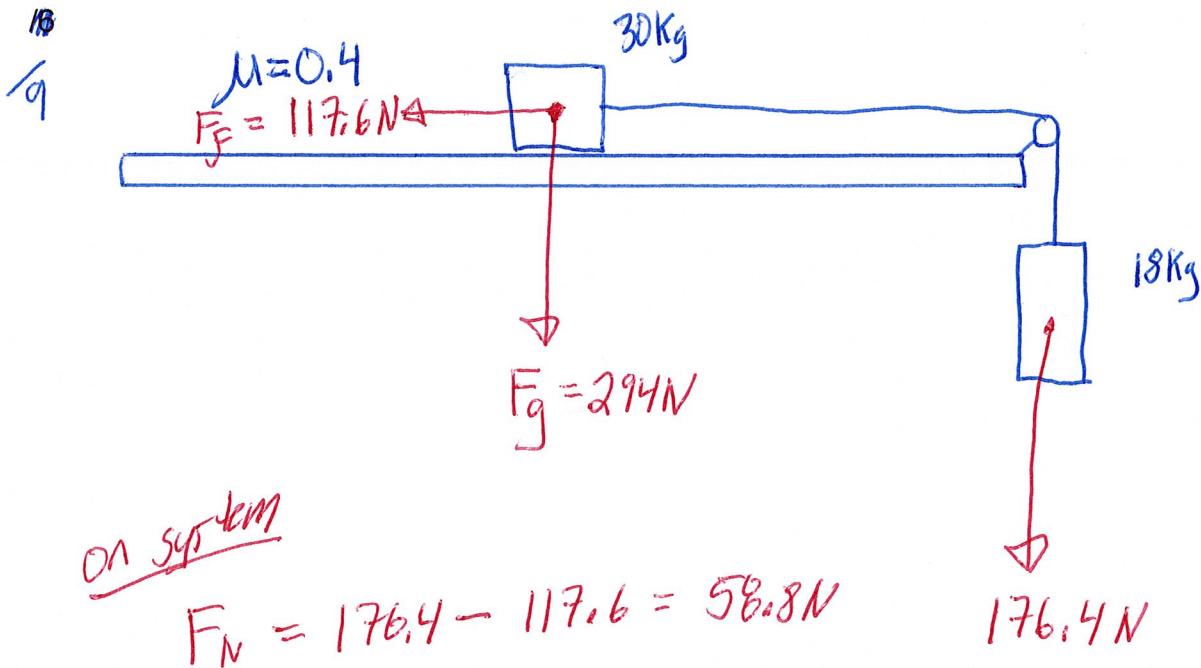
$a = \dfrac{F_N}{m} = 1.225 m/s^2$

look @ one mass

$F_N = F_g - T$

$T = ?$

$= F_N = ma = (18)(1.225) = 22.05 N$

$F_g = 176.4 N$

$T = F_g - F_N$
$= 176.4 - 22.05$
$= 154.35 N$

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7. For the system drawn below find the acceleration of the system and the tension in the cord.
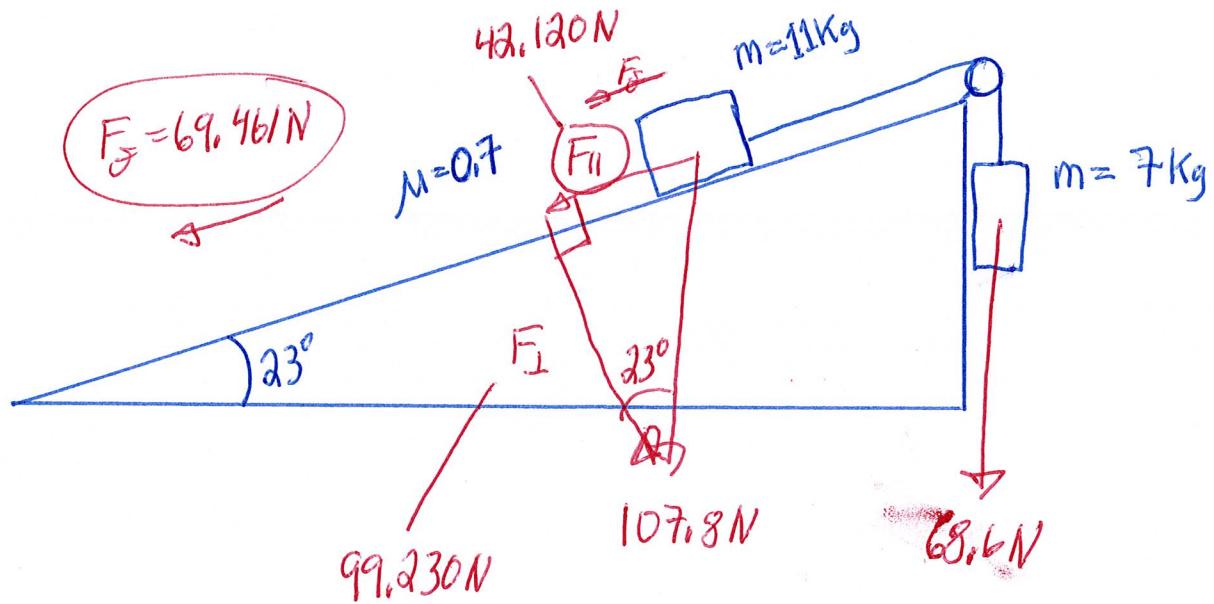
on system,

$$F_{NET} = 68.6 - 42.120 - F_{\mathcal{F}} \Rightarrow F_N = 0$$

$F_{\mathcal{F}}$ is big enough to keep system from

moving   accel = 0

Tension = Fg = 68.6 N