



ScienceGuyz

Partnered with:



PHYSICS 1 (1111/1211/1251)

Exam Review

Topics Covered: Chapter 5 – Newton's Laws of Motion

Having Trouble? Come to our weekly workshops and get ahead! Workshops are \$20 each and last 1-2 hours. All the workshops are recorded and available for viewing on demand during our normal business hours.

Need Help All Semester? Register for the Semester Plan which includes all workshops, exam reviews, final exam lab review and office hours. The Semester Plan price is only \$200 for the whole semester.

ScienceGuyz Hours of Operation: Mon-Thurs 1:30-8:30PM, Fri 1:30-5:30PM, Sun as scheduled

Tutor Contact Info: Kellie.Sappington@scienceguyz.com

Tutor Office Hours: See Master Calendar at ScienceGuyz.com

Classes Tutored by Science Guyz

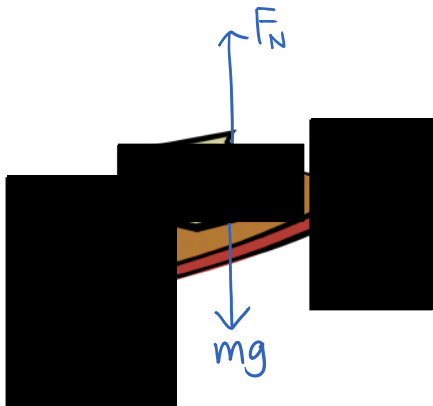
- Intro Biochemistry - BCMB3100
- General Chemistry 1 & 2 - CHEM1211/CHEM1212
- Organic Chemistry 1 & 2 - CHEM2211/CHEM2212
- Legal Studies - LEGL2700
- Calculus 1 - MATH2200/MATH2250
- Physics 1 - PHYS1111/PHYS1211/PHYS1251
- Physics 2 - PHYS1112/PHYS1212/PHYS1252

F_N

Normal = perpendicular (\perp) to
the surface.

$$F = m \cdot a$$

$$v=0 \text{ and } a=0$$



$$\sum F_y = F_N - mg = ma \overset{0}{\rightarrow}$$

$$F_N = mg$$

F_N , normal force



$$a=0$$

Constant speed
($a=0$)

$$\sum F_y = F_N - mg = 0$$

$$F_N = mg = \text{true weight}$$

$$a>0$$

$$\sum F_N = F_N - mg = ma$$

$$F_N = mg + ma > \text{true weight}$$



$$a<0$$

$$\sum F_y = F_N - mg = -ma$$

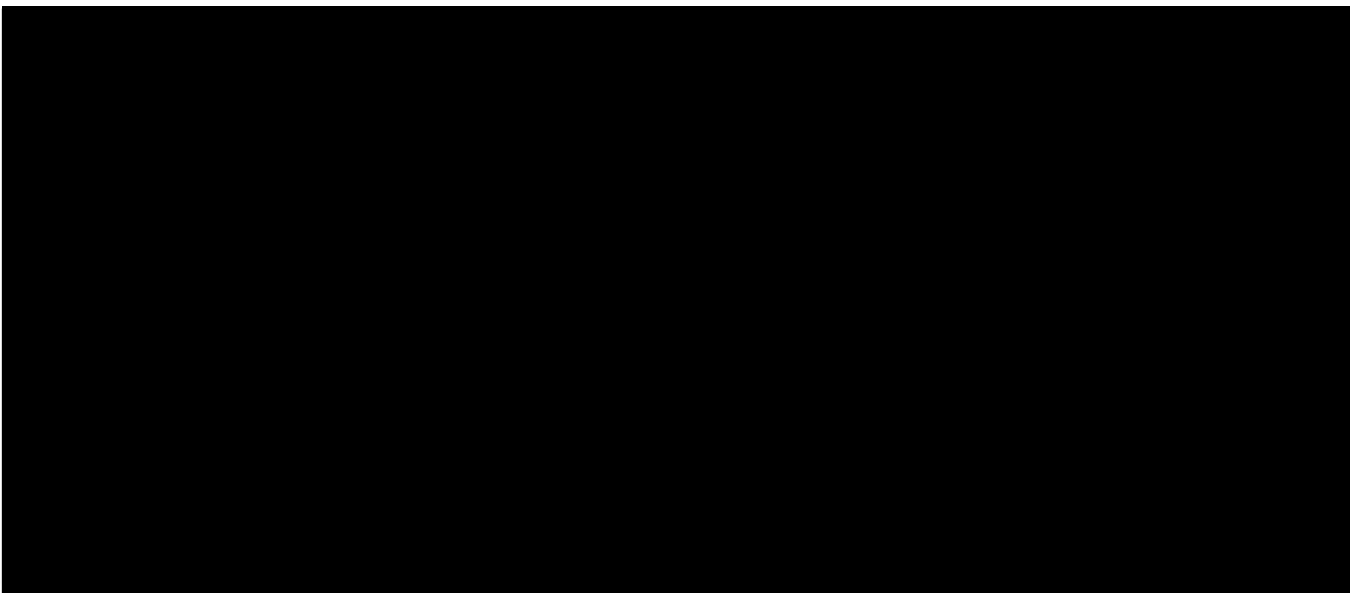
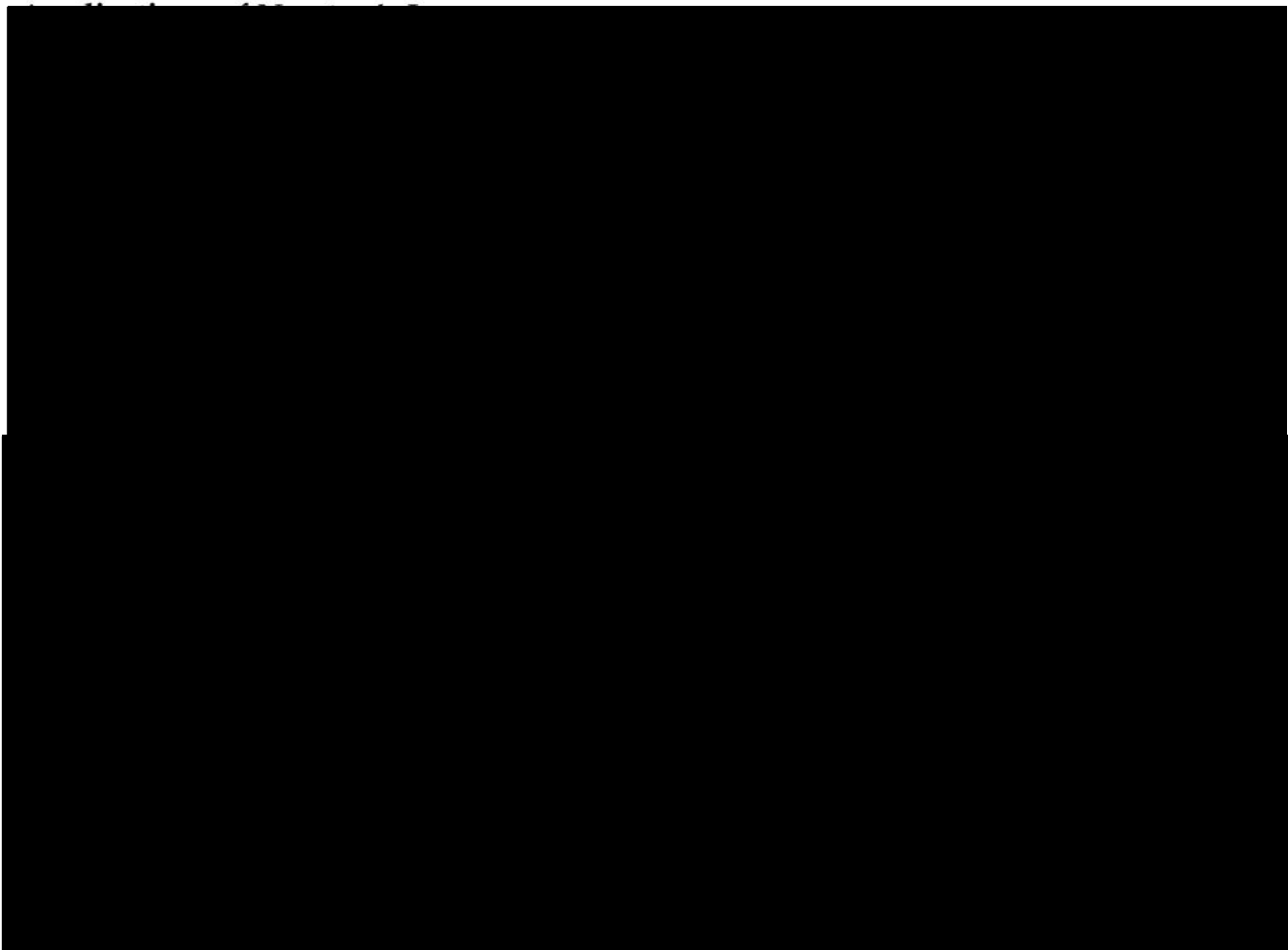
$$F_N = mg - ma < \text{true weight}$$



motion ($v=0$)

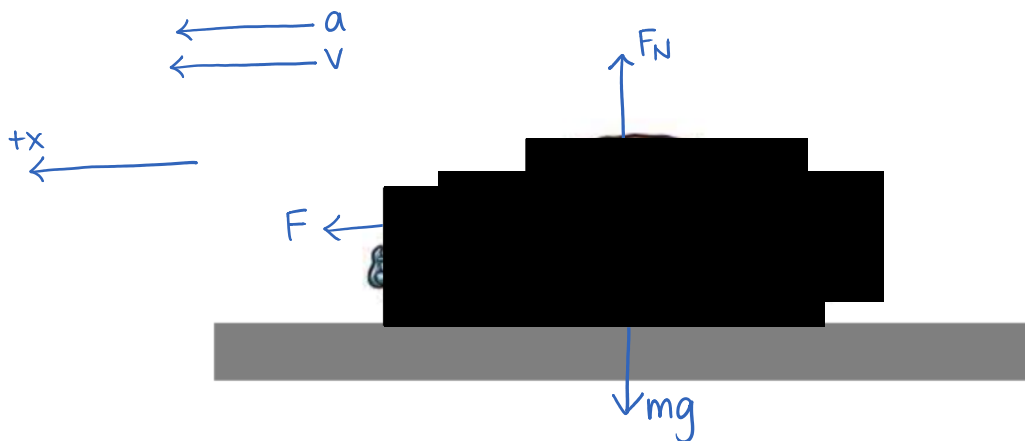
$$a=0$$

zero



Examples:

1.



Find F_N $\sum F_y = F_N - mg = 0$

$$F_N = mg$$
$$= (1500)(9.81) = 14,715 \text{ N}$$
$$\approx \boxed{14.7 \text{ kN}}$$

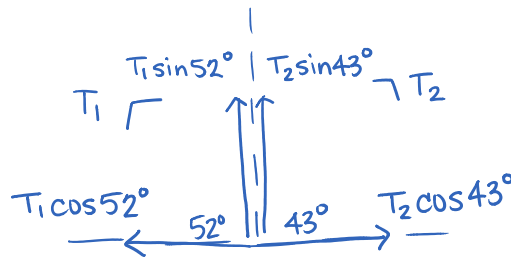
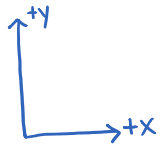
$$\overline{V=0, a=0}$$

$$15\text{N} = mg$$



$$\Sigma F_y = T_3 - mg = 0$$

$$\boxed{T_3 = mg = 15\text{N}}$$



$$\sqrt{T_3} = 15\text{N}$$

$$\Sigma F_x = T_2 \cos 43^\circ - T_1 \cos 52^\circ = 0$$

$$T_2 \cos 43^\circ = T_1 \cos 52^\circ$$

$$T_2 = \frac{T_1 \cos 52^\circ}{\cos 43^\circ} = 0.842 T_1$$

$$\Sigma F_y = T_1 \sin 52^\circ + T_2 \sin 43^\circ - 15\text{N} = 0$$

$$T_1 \sin 52^\circ + T_2 \sin 43^\circ = 15\text{N}$$

$$T_1 \sin 52^\circ + (0.842 T_1) \sin 43^\circ = 15\text{N}$$

$$T_1 (\sin 52^\circ + 0.842 \sin 43^\circ) = 1.350 T_1 = 15\text{N}$$

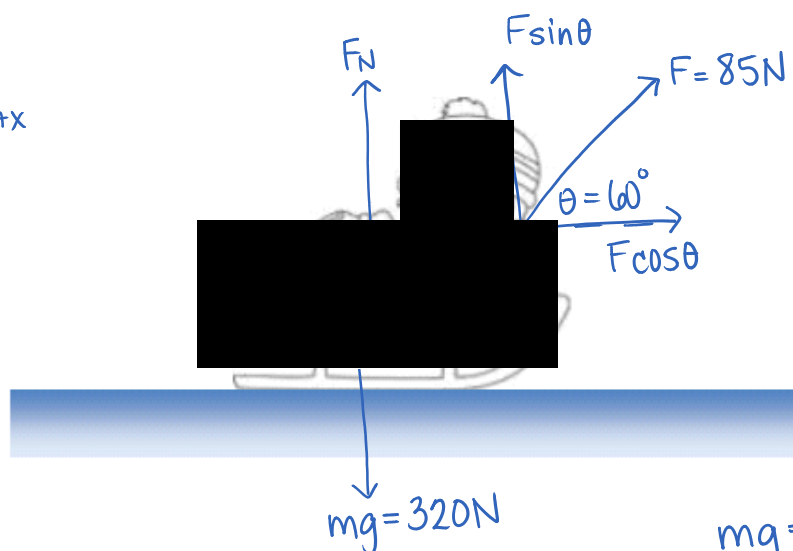
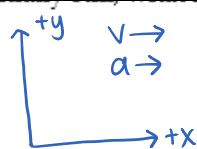
$$\boxed{T_1 = 11.1\text{N}} \quad T_2 = 0.842(11.1) = \boxed{9.36\text{N}}$$

$$11.1\text{N}$$

$$9.36\text{N}$$

$$15\text{N}$$

3.



$$\Sigma F_x = F \cos \theta = ma$$

$$\frac{F \cos \theta}{m} = a = \frac{85 \text{ N} \cos 60^\circ}{(320/g)} = 1.30 \text{ m/s}^2$$

$$mg = 320 \text{ N}$$
$$m = \frac{320}{g}$$

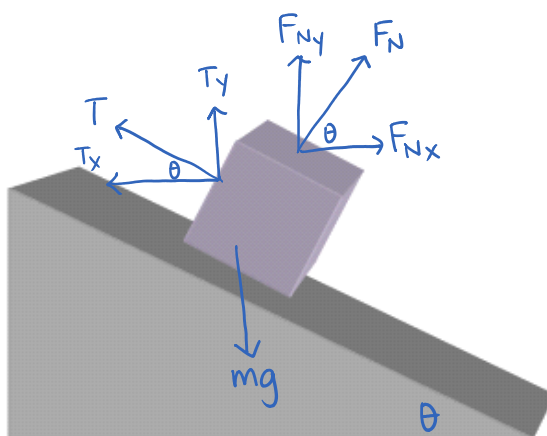
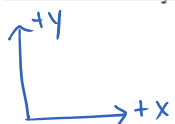
$$v(t) = v_0 + at$$

$$v(3) = (1.30 \text{ m/s})(3 \text{ s}) = \boxed{3.9 \text{ m/s}}$$

$$v(5) = (1.30 \text{ m/s})(5 \text{ s}) = \boxed{6.5 \text{ m/s}}$$

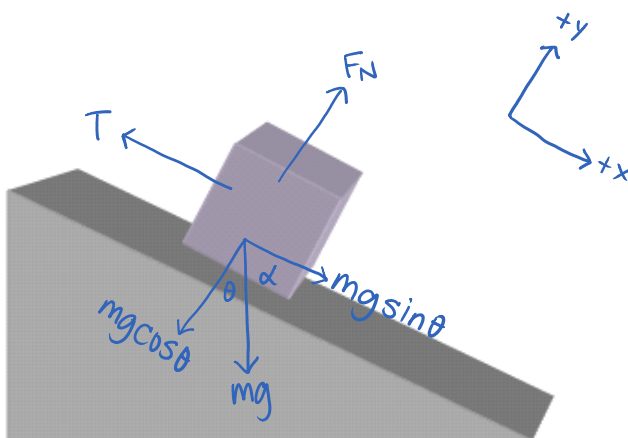
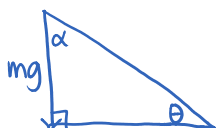
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Too many components

[Redacted]



only weight needs to be split

*Worth Memorizing

[Redacted]

$mg \sin \theta$

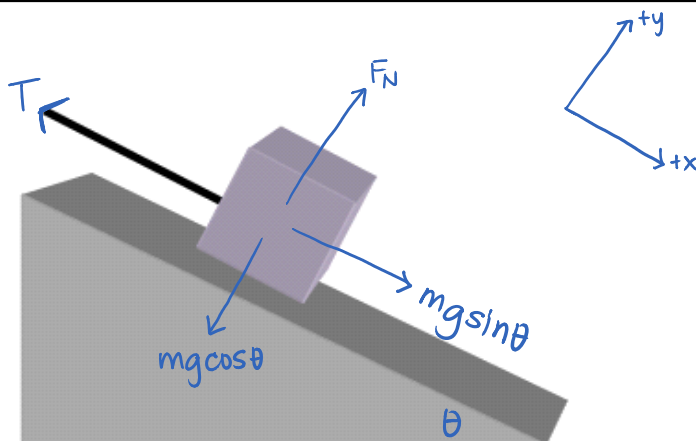
$mg \cos \theta$

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4.

$$v=0$$

$$a=0$$



$$\begin{aligned}\Sigma F_x &= mg \sin \theta - T = 0 \\ mg \sin \theta &= T = (3)(9.81) \sin(25^\circ) \\ &= \boxed{12.4 \text{ N}}\end{aligned}$$

$$\begin{aligned}\Sigma F_y &= F_N - mg \cos \theta = 0 \\ F_N &= mg \cos \theta = (3)(9.81) \cos(25^\circ) \\ &= \boxed{26.7 \text{ N}}\end{aligned}$$

12.4 N

26.7 N