Problem 1: A bullet with a mass of m = 16 g is shot out of a rifle that has length L = 1 m. The bullet spends t = 0.16 s in the barrel. Randomized Variables

m = 16 g L = 1 mt = 0.16 s

Part (a) Write an expression, in terms of the given quantities, for the magnitude of the bullet's average acceleration, a, as it travels through the rifle's barrel.

Correct Answer	Student Answer	Final Grade
$a = (2 L/t^2)$	$a = 2 L/(t^2)$	91%
Condo Detail		

Correct Student Feedback

Subm	ission Detail				Final Answer Credit	100%
	Answer		Hints	Feedback		Totals
1	$a = L/(t^2)$	4%	0%	Don't forget the 2 in the numerator.	5%	9%
2	$a = 2 L/(t^2)$	0%	0%		0%	0%
Tota	als	4%	0%		5%	9%

Part (b) Calculate the numerical value for the magnitude of the bullet's acceleration, a in m/s².

Correct Answer	Student Answer	Final Grade
a = 78.13	$a = 2/(0.16^2)$ a = 78.13	100%

Grade Detail
Correct Student Feedback

						Final Answer Credit	100%
Submis	sion Detail						
	Answer		Hints		Feedback		Totals
1	$a = 2/(0.16^2)$ a = 78.13	0%		0%		0%	0%
Total	s	0%		0%		0%	0%

Part (c) What is the numerical value of the average net force F in Newtons acting on the bullet?

Correct Answer	Student Answer	Final Grade
F = 1.25	F = 0.016 * 78.13	100%
	F = 1.25	

Grade Detail Correct

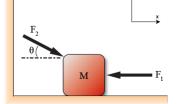
					Final Answer Credit	100%
Submis	ssion Detail Answer		Hints	Feedback		Totals
1	F = 0.016 * 78.13 F = 1.25	0%	0%		0%	0%
Total	ls	0%	0%		0%	0%

Feedback

Problem 2: A block with a mass of m=34 kg rests on a frictionless surface and is subject to two forces acting on it. The first force is directed in the negative x-direction with a magnitude of $F_2=10.5$ N. The second has a magnitude of $F_2=21.75$ N and acts on the body at an angle $\theta=14$ ° up from the horizontal as shown.

Randomized Variables

m = 34 kg $F_1 = 10.5 \text{ N}$ $F_2 = 21.75 \text{ N}$ $\theta = 14 ^{\circ}$



Correct Answer	Student Answer	Final Grade
r	r tr	72%
Grade Detail		

Correct	Student	Feedback		
			Final Answer Credit	100%

Answer		Hints		Feedback		Totals
$1 = \underbrace{ \underbrace{ \underbrace{ \underbrace{ \underbrace{ F_{c}} }_{F_{c}} }_{F_{c}} \underbrace{ F_{c}}_{F_{c}} }_{F_{c}}$	20%	-Draw the free-body diagram. In the given geometry, what force should be bigger: force of gravity or normal force?	3%	Be very careful with the geometry of the problem. Look closely at provided image and how things are labeled.	5%	28%
$\phantom{aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa$	0%		0%		0%	0%
Totals	20%		3%		5%	28%

Co	rrect Ansv	ver			Student Answer	Final Grade
F_n	$e_{t,x} = \mathbf{F}_2 \operatorname{co}$	s(θ) - F ₁			$F_{net,x} = F_2 \cos(\theta) + F_1$	17%
Fra	de Detail					
Co	rrect	Student	Feedback			
F ₂ F ₁	cos(θ) +	see above	Closely che coordinates		omponents. Is the component of F_1 along x positive in the given system of	70%
- I	mission De	tail			Final Answer Credit	30%
·uo	Answer	etan		Hints	Feedback	Totals
1	$F_{net,x} = F_2$ ((sin((θ)))-F ₁ (-	4% 1)	0%	Check your trigonometry. Is component of F_2 proportional to sin or cos of the angle? Also, is component F_1 directed in the positive direction of the given x ?	9%
2	F _{net,x} =]	$F_2 \sin(\theta)$	4%	0%	Note: Feedback provided here but not accessed during assignment. Pay careful attention to trigonometric relationships and how they affect components of the terms in your expression.	4%
3	$F_{net,x} = 1$	$F_2 \cos(\theta) + F$	1 0%	0%	Note: Feedback provided here but not accessed during assignment. Closely check the signs of components. Is the component of F ₁ along x positive in the given system of coordinates?	0%
To	tals		8%	0%	5%	13%

Assume that the surface it rests on is rigid.

Co	orrect Answer			Student Answer		Final Grade
F_{I}	$V = F_2 \sin(\theta) + m g$			$F_N = F_2 \sin(\theta) + m g$		96%
Gra	de Detail					
Co	orrect		Student	Feedback		
				Final Answer	Credit	100%
Sub	mission Detail					
	Answer		Hints	Feedback		Totals
1	$F_N = F_2 \sin(\theta) - m g$	4%	0%	Note: Feedback provided here but not accessed during assignment. Closely check the direction of all forces. Is force of gravity directed in the same direction as positive y?	0%	4%
2	$F_N = F_2 \sin(\theta) + m g$	0%	0%		0%	0%
	otals	4%	0%		0%	4%

Part (d) Solve numerically for the block's acceleration in the x-direction, a_{χ_2} in m/s².

Student

Correct Answer	Student Answer	Final Grade
$a_x = 0.3119$	$a_x = (21.75 * \cos(14) - 10.5)/34$	85%
	$a_{\rm v} = 0.3119$	

Feedback

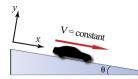
Grade Detail Correct

					Final Answer	Credit	100%
ub	mission Detail Answer		Hints		Feedback		Totals
1	$a_x = 10 (21.75 * cos(14) - 10.5)/34$ $a_x = 3.119$	4%	-You have already found the net force acting in x-direction. -Solve Newton's Second Law for the acceleration of the block.	6%	The answer provided was not correct. We have recognized the following, - Your answer appears to be off by a factor of 10. Ensure you have represented the number in the correct units Your answer appears to be the reciprocal of the correct answer.	5%	15%
2	$a_x =$ (21.75 * cos(14) - 10.5)/34 $a_x = 0.3119$	0%		0%		0%	0%
To	tals	4%		6%		5%	15%

Problem 3: A toy car rolls down a ramp at a constant velocity. The car's mass is m=2 kg and the ramp makes an angle of $\theta=\frac{20}{2}$ degrees with respect to the horizontal. Assume the rolling resistance is negligible.

Randomized Variables

m = 2 kg $\theta = 20^{\circ}$



Correct Answer		Student Answer		Final Grade
a = 0		a = 0		100%
Grade Detail				
Correct	Student	Feedback		
			Final Answer Credit	100%

1	a – v			70	U70		U 70	U70
To	tals		0	%	0%		0%	0%
Part	(b) What is the m	meric val	ue for the sum of t	he forces in the x-dir	ection, ΣF_{χ} , in New	vtons?		
Co	rrect Answer				Student Answer			Final Grad
	$x_{x} = 0$				$\Sigma F_x = 0$			100%
	de Detail rrect		Student	,	Feedback			
-	rrect		Student		cedoack	Final Answ	er Credit	1009
Sub	mission Detail			TI'		F. J. J.		T-4-1
1	Answer $\Sigma F_{_{X}} = 0$		0	Hints	0%	Feedback	0%	Tota 0%
To	tals		()%	0%		0%	0%
9-4	(c) Accoming #-	car avec	ances only size	stance in conociti	to its motion with	pagnitude F. Write an expression for the	e sum of 4.	e force
Part	(c) Assuming the	car experi	ences only air resi	stance in opposition	to its motion, with n	nagnitude F_p . Write an expression for th	e sum of th	e force:
		e accelera	tion due to gravity	, g, and the variable				Final
Co	rrect Answer				Student Answer			Grad
	$f_x = m g \sin(\theta) - F_t$				$\Sigma F_{\chi} = \text{m g sin}(\theta)$	F _r		87%
	de Detail rrect		Student	1	eedhack			
	de Detail rrect		Student]	Feedback	Final Answ	ver Credit	100%
Co	rrect mission Detail				Feedback	Final Answ	ver Credit	
Co	rrect mission Detail Answer	40/	Hints	Feedback	Feedback	Final Answ		Tota
Co	rrect mission Detail	4%			eedback	Final Answ	ver Credit	
Co Subi	mission Detail Answer $\Sigma F_{\chi} = \\ \text{m g sin}(\theta) \\ \Sigma F_{\chi} =$	4%	Hints	Feedback	ns of all components	Final Answ		Tota
Co Subi	mission Detail Answer $\Sigma F_x = $ m g $\sin(\theta)$		Hints	Feedback Closely check sign	ns of all components		0%	Total
Co Sub 1	mission Detail Answer $\Sigma F_{\chi} = $ m g sin(θ) $\Sigma F_{\chi} = $ m g sin(θ) + F _r	4%	Hints 0%	Feedback Closely check sign	ns of all components		0% 5%	Total 4% 9%
Co Subs 1 2	mission Detail Answer $\Sigma F_{\chi} = \\ \text{m g sin}(\theta) \\ \Sigma F_{\chi} = \\ \text{m g sin}(\theta) + F_{\text{r}} \\ \Sigma F_{\chi} = $	4%	Hints 0%	Feedback Closely check sign	ns of all components		0% 5%	Total 4% 9% 0%
Co Subs 1 2	$\begin{aligned} & \textbf{mission Detail} \\ & \textbf{Answer} \\ & \Sigma F_{\chi} = \\ & \textbf{m g sin}(\theta) \\ & \Sigma F_{\chi} = \\ & \textbf{m g sin}(\theta) + \textbf{F}_{\textbf{r}} \\ & \Sigma F_{\chi} = \\ & \textbf{m g sin}(\theta) - \textbf{F}_{\textbf{r}} \end{aligned}$	4%	Hints 0% 0% 0%	Feedback Closely check sign	ns of all components		0% 5%	Tota 4% 9% 0%
Co Subs 1 2 3	rrect	4% 0% 8%	Hints 0% 0% 0% 0% 0%	Feedback Closely check sign positive or negative	is of all components e x-direction?(0% 5% 0%	Total 4% 9% 0% 13%
Co Subi 1 2 3 To	rrect	4% 0% 8%	Hints 0% 0% 0% 0% 0%	Feedback Closely check sign positive or negative or negative by air resistance, F	is of all components e x-direction?(. Is the force of resistance directed in	0% 5% 0%	Tota 4% 9% 0% 13% mt.) Final
Co Subi 1 2 3 To	rrect $\begin{aligned} & \text{mission Detail} \\ & \text{Answer} \\ & \Sigma F_X = \\ & \text{m g sin}(\theta) \\ & \Sigma F_X = \\ & \text{m g sin}(\theta) + F_r \\ & \Sigma F_X = \\ & \text{m g sin}(\theta) - F_r \end{aligned}$ tals $\begin{aligned} & \text{(d) What is the m} \\ & \text{rrect Answer} \end{aligned}$	4% 0% 8%	Hints 0% 0% 0% 0% 0%	Feedback Closely check sign positive or negative or negative to the sign positive to the sign positive or negative to the sign positive to t	is of all components e x-direction?(i, in Newtons? (Main Student Answer	. Is the force of resistance directed in	0% 5% 0%	Total 4% 9% 0% 13% nnt.) Final Grad
Co Substitution To Part Co Fr	rrect mission Detail Answer $\Sigma F_X = m \text{ g } \sin(\theta)$ $\Sigma F_X = m \text{ g } \sin(\theta) + F_r$ $\Sigma F_X = m \text{ g } \sin(\theta) - F_r$ tals (d) What is the m	4% 0% 8%	Hints 0% 0% 0% 0% 0%	Feedback Closely check sign positive or negative or negative to the sign positive to the sign positive or negative to the sign positive to t	is of all components e x-direction?(i, in Newtons? (Main	. Is the force of resistance directed in	0% 5% 0%	Total 4% 9% 0% 13% nt.) Final
C_0 Subi	rrect mission Detail Answer $\Sigma F_X = m \text{ g sin}(\theta)$ $\Sigma F_X = m \text{ g sin}(\theta) + F_r$ $\Sigma F_X = m \text{ g sin}(\theta) - F_r$ tals $(\mathbf{d}) \text{ What is the m}$ rrect Answer $= 6.71$	4% 0% 8%	Hints 0% 0% 0% 0% 0%	Feedback Closely check sign positive or negative or negative to the sign positive to the sign positive or negative to the sign positive to t	is of all components e x-direction?(i, in Newtons? (Main Student Answer	. Is the force of resistance directed in	0% 5% 0%	Total 4% 9% 0% 13% nnt.) Final Grad
Co Subi	rrect mission Detail Answer $\Sigma F_X = \text{m g sin}(\theta)$ $\Sigma F_X = \text{m g sin}(\theta) + \text{F}_{\text{r}}$ $\Sigma F_X = \text{m g sin}(\theta) - \text{F}_{\text{r}}$ tals (d) What is the m rrect Answer = 6.71 de Detail rrect	4% 0% 8%	Hints 0% 0% 0% 0% f the force caused	Feedback Closely check sign positive or negative or negative to the sign positive to the sign positive or negative to the sign positive to t	is of all components e x-direction?(i, in Newtons? (Main Student Answer No Answer Given	. Is the force of resistance directed in	0% 5% 0%	Total 4% 9% 0% 13% Final Grad 0%
Co Subi	rrect mission Detail Answer $\Sigma F_X = \text{m g sin}(\theta)$ $\Sigma F_X = \text{m g sin}(\theta) + F_r$ $\Sigma F_X = \text{m g sin}(\theta) - F_r$ tals (d) What is the m rrect Answer = 6.71 de Detail	4% 0% 8%	Hints 0% 0% 0% 0% f the force caused	Feedback Closely check sign positive or negative or negative to the sign positive to the sign positive or negative to the sign positive to t	is of all components e x-direction?(i, in Newtons? (Main Student Answer No Answer Given	. Is the force of resistance directed in	0% 5% 0% 5%	9% 0% 13% mt.) Final Grade 0%