

**Problem 1:** Suppose a 70.7 kg gymnast is climbing a rope.

**Part (a)** What is the magnitude, in newtons, of the tension force in the rope if the gymnast climbs at a constant speed?

**Grade = 100%**

Correct Answer	Student Final Submission	Feedback
$F_T = 693.6 \text{ N}$	$F_T = 693.567$ $F_T = 693.6 \text{ N}$	
<b>Grade Summary</b>		
Deduction for Final Submission		0%
Deductions for Incorrect Submissions, Hints and Feedback [?]		0%
<b>Student Grade = 100 - 0 - 0 = 100%</b>		

**Submission History**

All Date times are displayed in Central Standard Time. Red submission date times indicate late work.

Date	Time	Answer	Hints	Feedback
1 Oct 23, 2024	1:40 PM	$F_T = 693.567$ $F_T = 693.6 \text{ N}$		

**Part (b)** What is the magnitude, in newtons, of the tension force in the rope if the climbing gymnast accelerates upward at a rate of 1.73 m/s<sup>2</sup>?

**Grade = 100%**

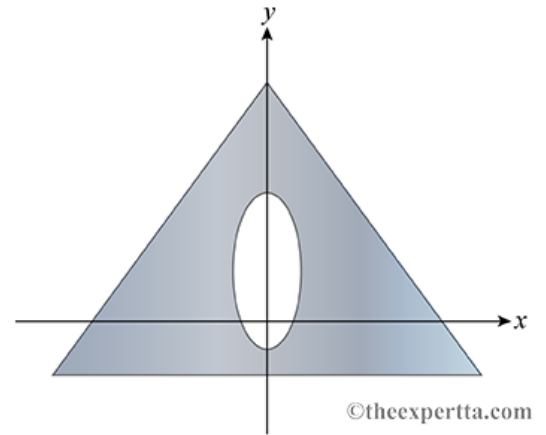
Correct Answer	Student Final Submission	Feedback
$F_T = 815.9 \text{ N}$	$F_T = 815.878$ $F_T = 815.9 \text{ N}$	
<b>Grade Summary</b>		
Deduction for Final Submission		0%
Deductions for Incorrect Submissions, Hints and Feedback [?]		0%
<b>Student Grade = 100 - 0 - 0 = 100%</b>		

**Submission History**

All Date times are displayed in Central Standard Time. Red submission date times indicate late work.

Date	Time	Answer	Hints	Feedback
1 Oct 23, 2024	1:42 PM	$F_T = 122.311$ $F_T = 122.3 \text{ N}$		
2 Oct 23, 2024	1:50 PM	$F_T = 815.878$ $F_T = 815.9 \text{ N}$		

**Problem 2:** The figure illustrates a uniform metal sheet shaped like a triangle, with a hole cut in the center.



Where is the center of mass of this object, relative to the coordinate system shown?

**Grade = 100%**

Correct Answer	Student Final Submission	Feedback
Somewhere on the y-axis, where $x = 0$ .	Somewhere on the y-axis, where $x = 0$ .	
<b>Grade Summary</b>		
Deduction for Final Submission	0%	
Deductions for Incorrect Submissions, Hints and Feedback [?]	0%	
<b>Student Grade = 100 - 0 - 0 = 100%</b>		

#### Submission History

All Date times are displayed in Central Standard Time. Red submission date times indicate late work.

Date	Time	Answer	Hints	Feedback
1   Oct 23, 2024	1:04 PM	Somewhere on the y-axis, where $x = 0$ .		

**Problem 3:** A woman has just left home for her morning commute and has forgotten that her coffee mug is on the roof of her car. At one point, as she is driving at a constant speed of 35 km/h, she sees a squirrel running in front of the car. She slams on the brakes and the coffee mug slides across the car's roof and falls onto the windshield and hood. An observer standing on the roadside witnesses this event. For this problem, consider the motion of the coffee mug from the moment the brakes are touched to just before it falls off the roof. (Assume that it slides across the roof with little to no friction.)

**Part (a)** In whose reference frame does the coffee mug accelerate forward?

**Grade = 0%**

Correct Answer	Student Final Submission	Feedback
The driver's	Neither the driver's nor the roadside observer's	
<b>Grade Summary</b>		
Deduction for Final Submission	100%	
Deductions for Incorrect Submissions, Hints and Feedback [?]	0%	
<b>Student Grade = 100 - 100 - 0 = 0%</b>		

### Submission History

All Date times are displayed in Central Standard Time. Red submission date times indicate late work.

	Date	Time	Answer	Hints	Feedback
1	Oct 23, 2024	1:33 PM	The roadside observer's		
2	Oct 23, 2024	1:48 PM	Neither the driver's nor the roadside observer's		

**Part (b)** In whose reference frame does the coffee mug move at constant velocity?

**Grade = 0%**

Correct Answer	Student Final Submission	Feedback
The roadside observer's	Both the driver's and the roadside observer's	

### Grade Summary

Deduction for Final Submission **100%**

Deductions for Incorrect Submissions, Hints and Feedback [?] **0%**

**Student Grade = 100 - 100 - 0 = 0%**

### Submission History

All Date times are displayed in Central Standard Time. Red submission date times indicate late work.

	Date	Time	Answer	Hints	Feedback
1	Oct 23, 2024	1:48 PM	Both the driver's and the roadside observer's		

**Problem 4:** A point on the second hand of a clock has a centripetal acceleration of **0.123** cm/s<sup>2</sup>.

How far is this point, in cm, from the rotational axis?

**Grade = 100%**

Correct Answer	Student Final Submission	Feedback
$r = 11.22$	$r = 11.2162$ $r = 11.22$	

### Grade Summary

Deduction for Final Submission **0%**

Deductions for Incorrect Submissions, Hints and Feedback [?] **0%**

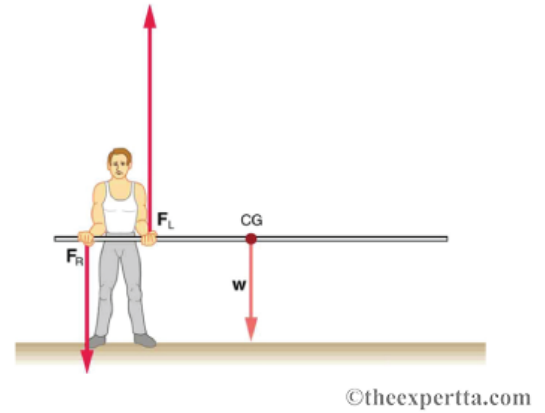
**Student Grade = 100 - 0 - 0 = 100%**

### Submission History

All Date times are displayed in Central Standard Time. Red submission date times indicate late work.

	Date	Time	Answer	Hints	Feedback
1	Oct 23, 2024	1:07 PM	$r = 11.2162$ $r = 11.22$		

**Problem 5:** In the figure, the center of gravity (CG) of the pole held by the pole vaulter is  $1.85$  m from the left hand, and the hands are  $0.68$  m apart. The mass of the pole is  $5.0$  kg.



**Part (a)** Calculate the magnitude of the force, in newtons, exerted by his right hand.

**Grade = 0%**

Correct Answer	Student Final Submission	Feedback
$F_R = 133.3$	$F_R = 49.05$	
<b>Grade Summary</b>		
Deduction for Final Submission	100%	
Deductions for Incorrect Submissions, Hints and Feedback [?]	0%	
<b>Student Grade = 100 - 100 - 0 = 0%</b>		

#### Submission History

All Date times are displayed in Central Standard Time. Red submission date times indicate late work.

Date	Time	Answer	Hints	Feedback
1 Oct 23, 2024	1:22 PM	$F_R = 49.05$		

**Part (b)** Calculate the magnitude of the force, in newtons, exerted by his left hand.

**Grade = 0%**

Correct Answer	Student Final Submission	Feedback
$F_L = 182.3$	$F_L = 98.10$	
<b>Grade Summary</b>		
Deduction for Final Submission	100%	
Deductions for Incorrect Submissions, Hints and Feedback [?]	0%	
<b>Student Grade = 100 - 100 - 0 = 0%</b>		

#### Submission History

All Date times are displayed in Central Standard Time. Red submission date times indicate late work.

Date	Time	Answer	Hints	Feedback
1 Oct 23, 2024	1:23 PM	$F_L = 98.10$		

**Problem 6:** Consider a  $66$  kg high-jumper.

Calculate the magnitude of the force, in newtons, the jumper must exert on the ground to produce an upward acceleration 4.00 times the acceleration due to gravity.

**Grade = 30%**

Correct Answer	Student Final Submission	Feedback
$F = 3234$	$F = 2589.84$ $F = 2590.$	You may have forgotten to include the force of gravity into your consideration. Check the free body diagram.

**Grade Summary**

Deduction for Final Submission 70%  
 Deductions for Incorrect Submissions, Hints and Feedback [?] 0%

**Student Grade = 100 - 70 - 0 = 30%**

**Submission History**

*All Date times are displayed in Central Standard Time. Red submission date times indicate late work.*

	Date	Time	Answer	Hints	Feedback
1	Oct 23, 2024	1:09 PM	$F = 2589.84$ $F = 2590.$		

**Problem 7:** A car and a dump truck are involved in an accident and crash into each other.

Assuming the only force acting is the force of collision, which one experiences the most force during the crash - the car or the dump truck?

**Grade = 100%**

Correct Answer	Student Final Submission	Feedback
They experience the same size force.	They experience the same size force.	

**Grade Summary**

Deduction for Final Submission 0%  
 Deductions for Incorrect Submissions, Hints and Feedback [?] 0%

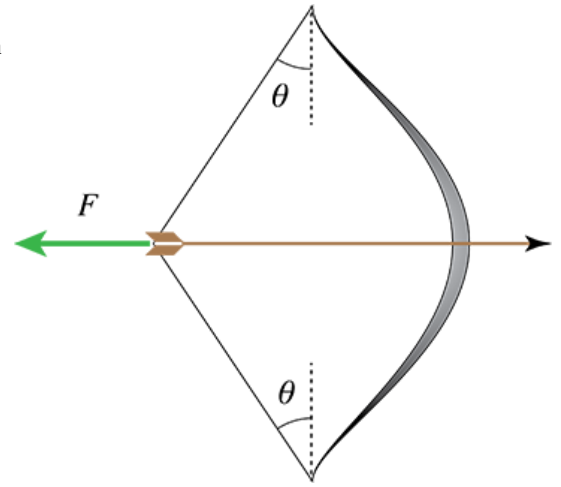
**Student Grade = 100 - 0 - 0 = 100%**

**Submission History**

*All Date times are displayed in Central Standard Time. Red submission date times indicate late work.*

	Date	Time	Answer	Hints	Feedback
1	Oct 23, 2024	1:10 PM	They experience the same size force.		

**Problem 8:** Consider a bow and arrow. Suppose the bow is held vertically, and the string is drawn back from its midpoint so the arrow is horizontal. Each half of the string makes an angle  $\theta$  with the vertical, as shown in the diagram. A horizontal force with magnitude  $F$  is applied to the tail of the arrow, and the system is motionless.



Write an expression for the tension,  $T$ , in the string.

**Grade = 0%**

Correct Answer	Student Final Submission	Feedback
$T = F / (2 \sin(\theta))$	$T = 2 (m g \cos(\theta))$	

**Grade Summary**

Deduction for Final Submission **100%**  
 Deductions for Incorrect Submissions, Hints and Feedback **[?] 0%**

**Student Grade = 100 - 100 - 0 = 0%**

**Submission History**

All Date times are displayed in Central Standard Time. Red submission date times indicate late work.

Date	Time	Answer	Hints	Feedback
1 Oct 23, 2024	1:11 PM	$T = 2 (m g \cos(\theta))$		
2 Oct 23, 2024	1:50 PM	$T = 2 (m g \cos(\theta))$		

**Problem 9:** A 65-kg person climbs some stairs at a constant rate, gaining 2.2 meters in height.

Find the work done by the person, in joules, to accomplish this task.

**Grade = 100%**

Correct Answer	Student Final Submission	Feedback
$W = 1401$	$W = 1402.83$ $W = 1403$	

**Grade Summary**

Deduction for Final Submission **0%**  
 Deductions for Incorrect Submissions, Hints and Feedback **[?] 0%**

**Student Grade = 100 - 0 - 0 = 100%**

### Submission History

All Date times are displayed in Central Standard Time. Red submission date times indicate late work.

	Date	Time	Answer	Hints	Feedback
1	Oct 23, 2024	1:17 PM	$W = 1402.83$ $W = 1403$		

**Problem 10:** A roller coaster car has a speed of  $v_0 = 6.6$  m/s as it arrives at the highest point of a  $h = 29$  m plunge.

What is the car's speed at the bottom of the plunge,  $v_f$  in m/s?

**Grade = 0%**

Correct Answer	Student Final Submission	Feedback
$v_f = 24.75$	$v_f = 22.92$	
<b>Grade Summary</b>		
Deduction for Final Submission		100%
Deductions for Incorrect Submissions, Hints and Feedback [?]		0%
<b>Student Grade = 100 - 100 - 0 = 0%</b>		

### Submission History

All Date times are displayed in Central Standard Time. Red submission date times indicate late work.

	Date	Time	Answer	Hints	Feedback
1	Oct 23, 2024	1:32 PM	$v_f = 22.92$		

**Problem 11:** Former UT Diver Alison Gibson, who we will assume has a mass of  $57.8$  kilograms, steps off a diving board and drops straight down into the water. The effect of the water is to contribute an average force of resistance of  $1520$  Newtons on the diver. If the diver comes to rest  $4.8$  meters below the water's surface, what is the total distance between the diving board and the diver's stopping point underwater?

If the diver comes to rest  $4.8$  meters below the water's surface, what is the total distance between the diving board and the diver's stopping point underwater?

**Grade = 0%**

Correct Answer	Student Final Submission	Feedback
Total Distance = 12.87 meters	Total Distance = 11.40 meters	
<b>Grade Summary</b>		
Deduction for Final Submission		100%
Deductions for Incorrect Submissions, Hints and Feedback [?]		0%
<b>Student Grade = 100 - 100 - 0 = 0%</b>		

### Submission History

All Date times are displayed in Central Standard Time. *Red submission date times indicate late work.*

	Date	Time	Answer	Hints	Feedback
1	Oct 23, 2024	1:47 PM	Total Distance = 11.40 meters		