Welcome to the homework page test1. If this isn't you then please go back to the homework login page.

=KEY=

You may log out and return later if you wish without losing any saved data. You will have **TEN** attempts for each assigned problem. Every unsuccessful attempt will lower that part of the problem's value by 5%.

For example, if you get it right on the first try, then you will receive 100% for that problem. If you are twice incorrect and submit the correct on the third try, then you will receive a 90% for that part of the problem. You will not recieve any points for that part of the problem after 10 attempts.

You do not have to answer all the problems during a single session or in any particular order. To answer a problem simply type the numerical value in the box provided, check the box to the right of the part(s) you want to answer, and then click the submit button. You can freely log in and out of the homework page without losing any submitted information so feel free to take breaks if necessary.

LETS BEGIN!

Problem #1

a) $\text{STRESS} = F/A = \frac{86.5}{\pi(.0243)^2} = 46{,}630\ N/m^2$ (IS PRESSURE)

A rod of length $L_0 = 3.25$m and radius $r = 2.43$cm has one end attached to a wall and the other end is being compressed with a force of $|\mathbf{F}| = 86.5$N. (a) What is the magnitude of the scalar tensile stress of the object? (b) If we assume that the area of the rod is approximately constant and the applied force compressed the rod to a distance of $L = 3.18$m, then what is the Young's modulus of the rod?

(a) 46630 N/m² ☑ Answer part (a)

(b) 2.16E6 N/m² ☐ Answer part (b)

b) $P = F/A = Y\frac{\delta L}{L_0}$

$Y = P/\left(\frac{\delta L}{L_0}\right) = \frac{46630}{\left(\frac{3.25-3.18}{3.25}\right)}$

$Y = 2.16 \times 10^6\ N/m^2$

Submit

Attempted part (a) 0 times and part (b) 0 times.

There have been no attempts to answer part (a)

There have been no attempts to answer part (b)

Problem #2

A square rod of length $L_0 = 2.15$m and sidelength $d = 6.28$cm is compressed with a force of $|\mathbf{F}_C| = 82.8$N in the direction of the long axis. (a) What is the magnitude of the scalar tensile stress? (b) If we assume that the area of the square rod is approximately constant and its final resting length is $L = 2.05$m, then what is the Young's modulus of the square rod? Now assume that the rod is stuck between two slabs that are separated by the sidelength of the rod. (c) What is the shear stress when the magnitude of the force of the top slab on the square rod in the direction of the long axis of the rod is $|\mathbf{F}_S| = 75.8$N? (d) If the total distance that the top of the rod moved, as compared to the bottom of the rod, is $\Delta x = 0.201$cm, then what is the shear modulus of the rod in this geometry?

(a) 21000 N/m² Answer part (a)

(b) 4.52E5 N/m² Answer part (b)

(c) 561.5 N/m² Answer part (c)

(d) 17542 N/m² Answer part (d)

Submit

Attempted part (a) 0 times, part (b) 0 times, part (c) 0 times, and part (d) 0 times.

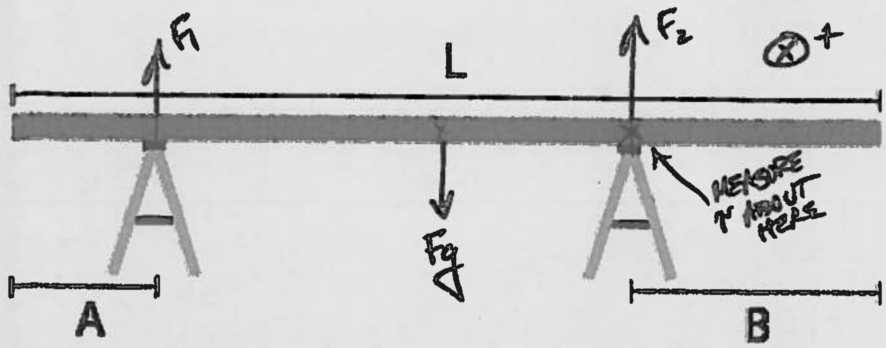
There have been no attempts to answer part (a)

There have been no attempts to answer part (b)

There have been no attempts to answer part (c)

There have been no attempts to answer part (d)

Problem #3



$\Sigma F_y = 0 \Rightarrow F_1 + F_2 - mg = 0$

$\Sigma \tau = 0$: τ_{F_2}: 0; τ_{F_1}: $F_1(L-B-A)$; τ_{Fg}: $-mg(L-B-L/2)$

$\Rightarrow F_1(2.255) - (13.6)9.8(0.825) = 0$

A beam of length L = 3.95m and mass m = 13.6kg with uniform mass density rests on two saw horses. The first saw horse is a distance A = 0.545m from the end of the beam and the other saw horse is a distance B = 1.15m from the other end of the beam as shown in the above diagram. (a) What is the force of the first saw horse on the beam? (b) What is the force of the second saw horse on the beam?

a) $\Rightarrow F_1 = 48.76\,N$

(a) 48.76 N Answer part (a)

(b) 84.52 N Answer part (b)

b) $F_2 = (13.6)(9.8) - F_1 = 84.52\,N$

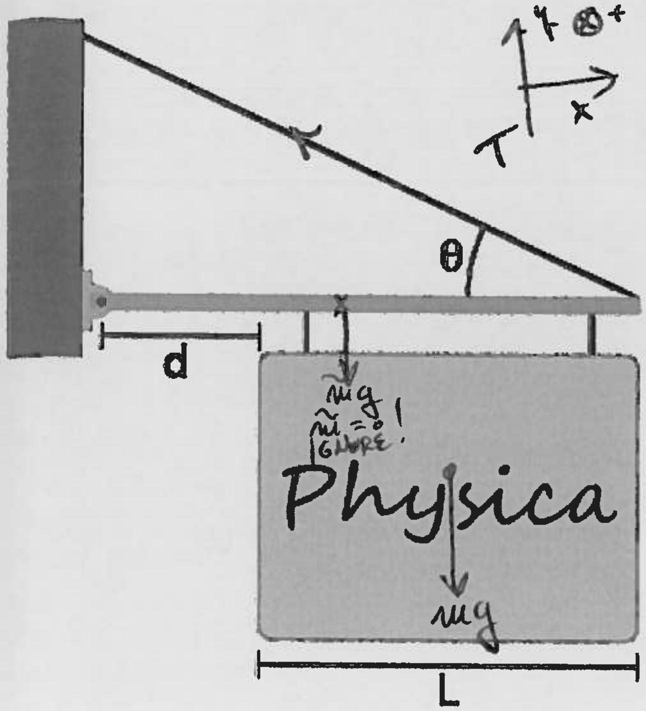
Submit

Attempted part (a) 0 times and part (b) 0 times.

There have been no attempts to answer part (a)

There have been no attempts to answer part (b)

Problem #4



A uniform sign of m = 1.05kg and width L = 0.525m hangs from a light weight horizontal beam hinged at the wall and supported by a cable as illustrated in the above diagram above. The edge of the sign is a distance d = 0.112m away from the hinge and the cable makes an angle θ = 40.7° with respect to the top of the sign. (a) What is the tension in the cable? (b) What is the magnitude of the reaction force exerted by the wall on the beam?

(a) 9.277 N Answer part (a)

(b) 8.213 N Answer part (b)

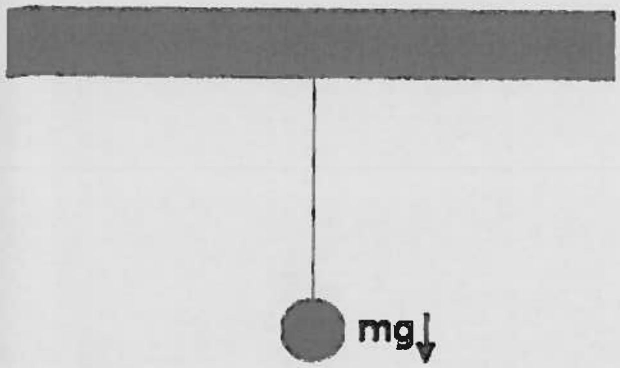
Submit

Attempted part (a) 0 times and part (b) 0 times.

There have been no attempts to answer part (a)

There have been no attempts to answer part (b)

Problem #5



A wire with a cross-sectional area of 1.05cm^2 is hanging from the ceiling with an object of mass m = 8.32kg attached to the other end as illustrated above. If the wire has a Young's modulus of $Y_t = 7.75 \times 10^9$ N/cm^2 and an initial length of L_0 = 1.45m, then how much does the cable stretch due to the hanging object?

| 0.0145 | μm ☑ Answer the question |

$P = F/A = Y \frac{\delta L}{L_0}$

$\frac{(8.32)(9.8)}{1.05} = 7.75 \times 10^9 \cdot \frac{\delta L}{1.45}$

$\delta L = 1.453 \times 10^{-8}$ m

OR 0.0145 μm

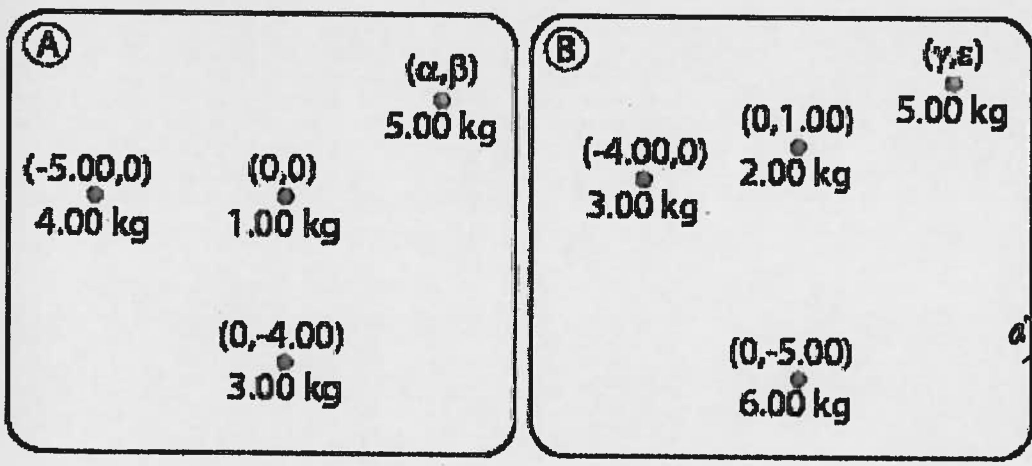
Submit

Attempted the problem 0 times.

There have been no attempts to answer the problem

Problem #6

$\vec{X}_{cm} = \frac{\sum m_i \vec{X}_i}{\sum m_i}$



$\vec{X}_{cm} = (0,0) \Rightarrow$

$\sum m_i \vec{X}_i = 0 \Rightarrow$

$\sum m_i X_i = 0 \quad \sum m_i y_i$

(A)

a) $4(-5) + 1(0) + 3(0) + 5(\alpha) =$

$\Rightarrow \alpha = 4$

b) $4(0) + 1(0) + 3(-4) + 5(\beta)$

$\Rightarrow \beta = \frac{12}{5} =$

$\beta = 2.4$

In each of the above diagrams, there are four point masses with coordinates labeled as (x,y) and in units of meters. In diagram A, what are the values of (a) α and (b) β for the center of mass of the objects to be at (0,0)? In diagram B, what are the values of (c) γ and (d) ε for the center of mass of the objects to be at

(0,0)?

(a) 4.0 m Answer part (a)

(b) 2.4 m Answer part (b)

(c) 2.4 m Answer part (c)

(d) 5.6 m Answer part (d)

b) $3(-4)+2(0)+6(0)+5\gamma=0$ $\gamma=+2.4$

c)

d) $3(0)+2(1)+6(-5)+5\epsilon=0$ $5.6=\epsilon$

Submit

Attempted part (a) 0 times, part (b) 0 times, part (c) 0 times, and part (d) 0 times.

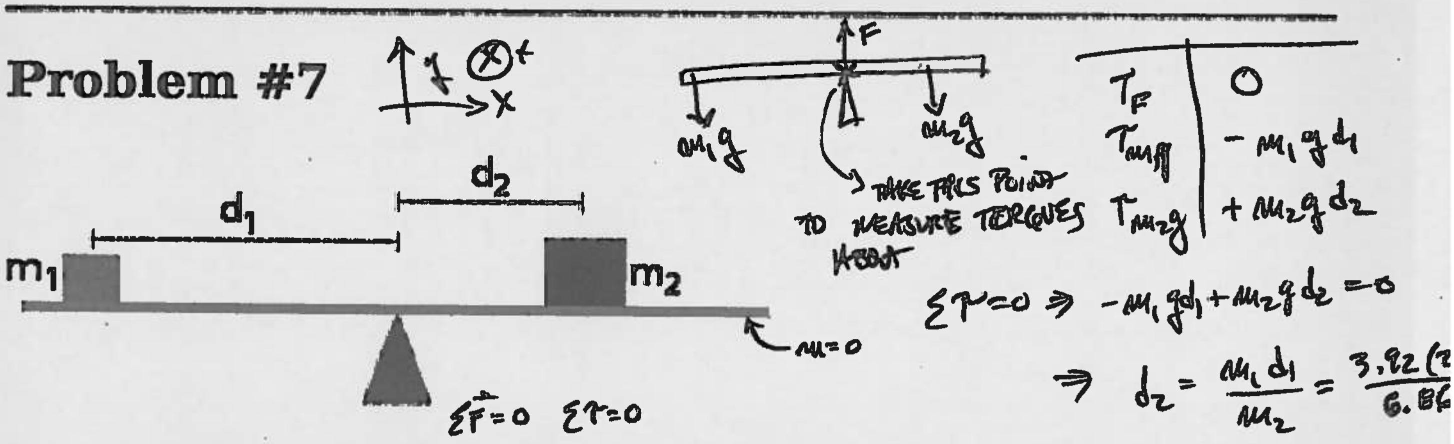
There have been no attempts to answer part (a)

There have been no attempts to answer part (b)

There have been no attempts to answer part (c)

There have been no attempts to answer part (d)

Problem #7



A board is perfectly balanced on a pivot as shown in the diagram above. A mass of $m_1 = 3.92$kg is placed a distance $d_1 = 2.04$m from the pivot point. If we have another mass of $m_2 = 6.86$kg, then what magnitude of distance, d_2, does it need to be from the pivot point to perfectly balance the system?

1.166 m Answer the question

$d_2 = 1.166$ m

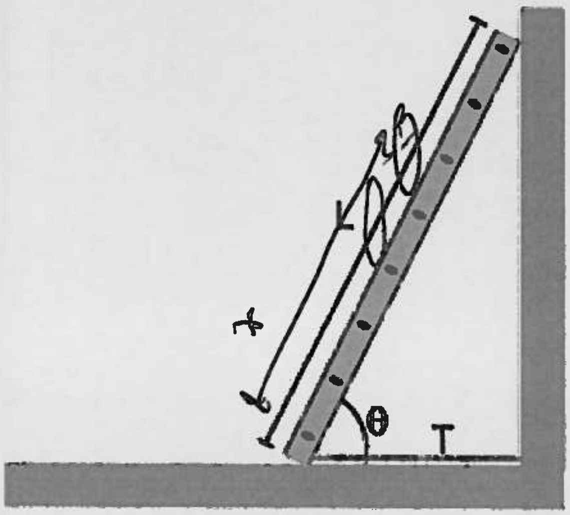
Submit

Attempted the problem 0 times.

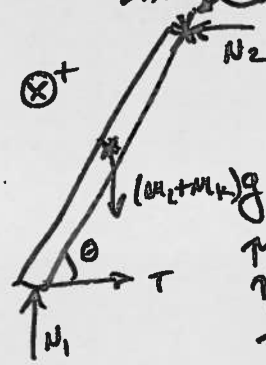
There have been no attempts to answer the problem

Problem #8

a) HALFWAY UP LADDER ⇒ LIKE A LADDER W/O CHILD BUT OF TOTAL MASS 10.1 + 12.2 kg = 22.3 kg SINCE IN THIS CASE CHILD WEIGHT IS AT SAME LOC AS LADDER WEIGHT.



DRAW FBD, MEASURE τ ABOUT THIS POINT FOR SIMPLIC



$\otimes^{+}$

$\Sigma F_x = 0 \Rightarrow N_2 = T$

$\Sigma F_y = 0 \Rightarrow N_1 = (m_L + m_K)g$

$\Sigma \tau = 0 \Rightarrow T L S_{59.7} = (m_L + m_K) g \ldots$

	0
τ_{N_2}	
$\tau_{(m_L+m_K)g}$	$-(m_L+m_K)g \cdot \frac{L}{2} C_{59.7}$
τ_T	$-T L S_{59.7}$
τ_{N_1}	$+N_1 L C_{59.7}$

A small child of mass 10.1kg climbs a ladder that is in contact with two frictionless surfaces as shown in the above diagram. The ladder has an approximately uniform mass of 12.2kg with a length of 2.95m and makes a 59.7° angle with respect to the horizon. The bottom of the ladder is attached to the wall with a string that can support a maximum tension of 79.7N before it breaks. (a) What is the tension in the string when the child is halfway up the ladder? (b) What is the maximum distance that the child can climb up the ladder before the string breaks?

a) $T = \frac{(m_L + m_K)g}{2} \frac{C_{59.7}}{S_{59.7}} = 63.85$

(a) 63.85 N ☑ Answer part (a)

(b) 2.28 m ☑ Answer part (b)

b) So, AT BREAKING T = 79.7 N. AS CHILD MOVES A DISTANCE X UP THE LADDER, THE τ CHART CHANGES!

	0
τ_{N_2}	
$\tau_{m_K g}$	$-m_K g (L - x) C_{59.7}$
$\tau_{m_L g}$	$-m_L g \frac{L}{2} C_{59.7}$
τ_T	$-79.7 L S_{59.7}$
τ_N	$(m_K + m_L) g L C_{59.7}$

$\Sigma \tau = 0 \Rightarrow -79.7 L S_{59.7} + m_L g \frac{L}{2} C \ldots + m_K g C_{59.7} \ldots = 0$

Submit

Attempted part (a) 0 times and part (b) 0 times.

There have been no attempts to answer part (a)

$\Rightarrow x = \frac{(79.7 S_{59.7} - 12.2(9.8)/2\, C_{59.7})(2.95)}{(10.1)(9.8) C_{59.7}}$

$x = 2.28\ m$

