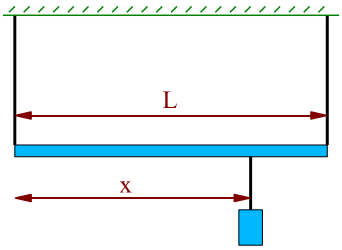
1 pt



Two wires support a beam of length L=8 m and mass 210 kg as shown in the figure above. A box of mass 140 kg hangs from a wire which hangs from the beam a distance x=6 m away from the left edge of the beam. What is the tension in the left support wire? *(in* N*)*

1.A◯ 745 **B**◯ 842 **C**◯ 952 **D**◯ 1076
E◯ 1215 **F**◯ 1373 **G**◯ 1552 **H**◯ 1754

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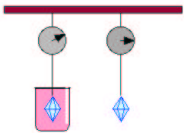
1 pt



A piece of moon rock reads 33.8 grams on a scale when in air, but 13.2 grams in alcohol (specific gravity = 0.79). What is the density of the moon rock in kg/m^3?

2.A◯ 1.30×10^3 **B**◯ 1.52×10^3 **C**◯ 1.77×10^3
D◯ 2.08×10^3 **E**◯ 2.43×10^3 **F**◯ 2.84×10^3
G◯ 3.33×10^3 **H**◯ 3.89×10^3

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1 pt A figure skater is spinning with her arms and one leg extended as far as she can. She then pulls them in tight to her body. As her position contracts,

▷ her moment of inertia _____.
3. **A**◯ decreases **B**◯ increases **C**◯ remains the same

▷ her rotational kinetic energy _____.
4. **A**◯ decreases **B**◯ increases **C**◯ remains the same

▷ her angular momentum _____.
5. **A**◯ decreases **B**◯ increases **C**◯ remains the same

▷ her angular velocity _____.
6. **A**◯ decreases **B**◯ increases **C**◯ remains the same

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1 pt At what temperature (K) does the average KE of a molecule in an ideal gas equal $3.9 \cdot 10^{-21}$ J?

7.A◯ 147.55 **B**◯ 166.73 **C**◯ 188.41
D◯ 212.90 **E**◯ 240.58 **F**◯ 271.85
G◯ 307.19 **H**◯ 347.13

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1 pt An immersion heater has a power rating of 1100 watts. It is used to heat water for coffee. How many liters of water can be brought from room temperature (20°C) to 90°C in 45 minutes?

8.A◯ 3.38 **B**◯ 3.95 **C**◯ 4.62 **D**◯ 5.41
E◯ 6.33 **F**◯ 7.40 **G**◯ 8.66 **H**◯ 10.14

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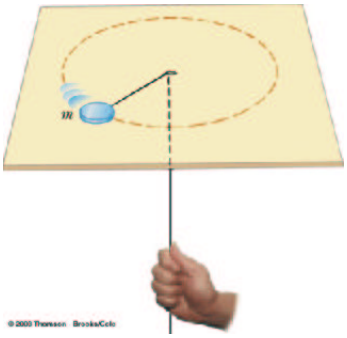
1 pt



The puck in the figure has a mass of 0.17 kg. Its original distance from the center of rotation is 55 cm, and the puck is moving with a speed of 2.9 m/s in a circle. The string is pulled downward until the center of rotation has moved to r=27.5 cm. The table is effectively frictionless. What is the work required to pull the puck to the new position? *(in* J*)*

9.A◯ 0.33 **B**◯ 0.49 **C**◯ 0.70 **D**◯ 1.02
E◯ 1.48 **F**◯ 2.14 **G**◯ 3.11 **H**◯ 4.51

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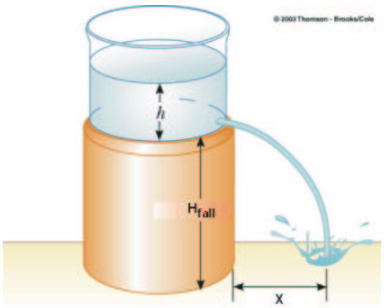
1 pt

A stainless steel orthodontic wire is applied to a tooth, as shown in the figure above. The wire has an unstretched length of 30 mm and a cross sectional area of 3 mm^2. The wire is stretched 0.1 mm. Young's modulus for stainless steel is 1.8×10^{11} Pa. What is the tension in the wire? *(in* N*)*

10.A◯ 821 **B**◯ 961 **C**◯ 1124 **D**◯ 1315
E◯ 1538 **F**◯ 1800 **G**◯ 2106 **H**◯ 2464



A jet of water squirts out horizontally from a hole near the bottom of the tank as shown in the figure above. The water leaves the tank at a speed of 1.82 m/s. What is the height h of the water level in the tank?

1 pt

(in `cm`*)*

11.**A**◯ 7.99 **B**◯ 11.59 **C**◯ 16.80
D◯ 24.36 **E**◯ 35.32 **F**◯ 51.22
G◯ 74.26 **H**◯ 107.68

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1 pt If 1.0 cubic meters of a building material weighs 5.5×10^4 N, what is the height of the tallest cylindrical pillar that will not collapse under its own weight? The compression strength of this material (the maximum pressure that can be exerted on the base of the structure) is 1.8×10^7 Pa. *(in* `m`*)*

12.**A**◯ 256 **B**◯ 290 **C**◯ 327 **D**◯ 370
E◯ 418 **F**◯ 472 **G**◯ 534 **H**◯ 603

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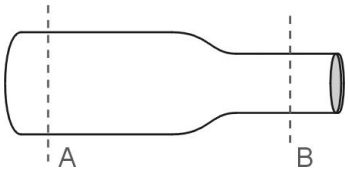
1 pt



An incompressible fluid moves through a pipe from left to right as shown above. The pipe narrows from a diameter of 5 cm at "A" to a diameter of 3 cm at "B". (Assume non-viscous laminar flow)

▷ Then density of the fluid at "A" is _____ the density of the fluid at "B".

13. **A**◯ equal to **B**◯ greater than
C◯ less than

▷ The pressure at "A" is _____ the pressure at "B".

14. **A**◯ equal to **B**◯ greater than
C◯ less than

▷ The amount of fluid that passes "A" in one second is _____ the amount of fluid that passes "B" in one second.

15. **A**◯ equal to **B**◯ greater than
C◯ less than

▷ The velocity of the fluid at "A" is _____ the velocity of the fluid at "B".

16. **A**◯ equal to **B**◯ greater than
C◯ less than

You are correct. Your receipt is 498-1501

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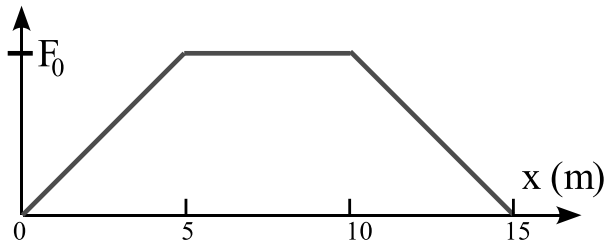
1 pt



Consider the graph of force, F, vs. position, x, shown above. The hashmark on the vertical axis denotes a value F_0=30 N. Find the velocity of a 9.7-kg object as it moves from x = 0.0 to x = 15.0 m after starting at rest. *(in* `m/s`*)*

17.**A**◯ 3.78 **B**◯ 4.27 **C**◯ 4.82 **D**◯ 5.45
E◯ 6.16 **F**◯ 6.96 **G**◯ 7.86 **H**◯ 8.89
