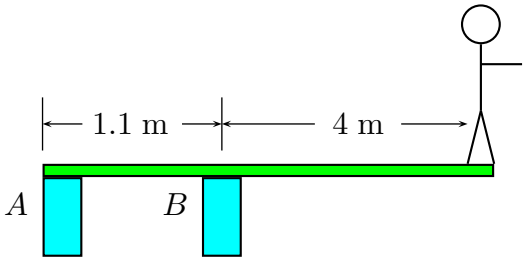
This print-out should have 14 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

001 (part 1 of 2) 10.0 points

The uniform diving board shown in figure has a mass of 31 kg .

The acceleration of gravity is 9.81 m/s^2 .



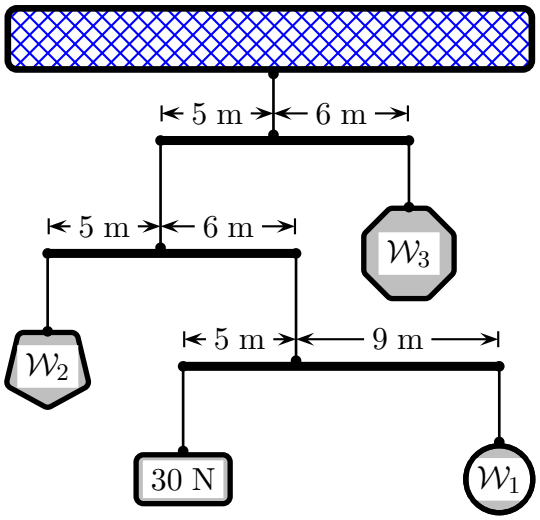
Find the force on the support A when a 70 kg diver stands at the end of the diving board. Answer in units of kN.

002 (part 2 of 2) 10.0 points

Find the force on the support B at that same instant. Answer in units of kN.

003 (part 1 of 3) 10.0 points

A mobile consists of four weights hanging on three horizontal rods of negligible mass.



Find the unknown weight on the lower rod. Answer in units of N.

004 (part 2 of 3) 10.0 points

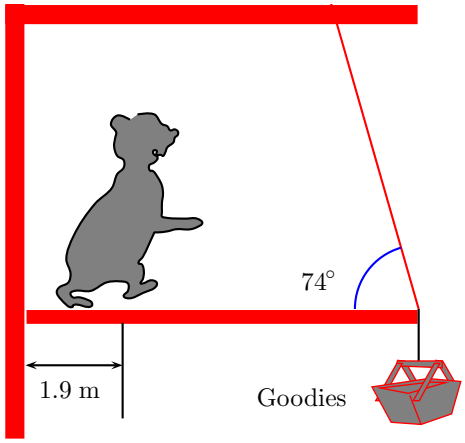
Find the unknown weight on the middle rod. Answer in units of N.

005 (part 3 of 3) 10.0 points

Find the unknown weight on the upper rod. Answer in units of N.

006 (part 1 of 4) 10.0 points

A hungry 504 N bear walks out on a beam in an attempt to retrieve some "goodies" hanging at the end. The beam is uniform, weighs 321 N, and is 7.69 m long; the goodies weigh 72.4 N.



When the bear is 1.9 m from the hinged end, find the tension in the wire. Answer in units of N.

007 (part 2 of 4) 10.0 points

Find the vertical component of the reaction force at the hinge. Answer in units of N.

008 (part 3 of 4) 10.0 points

Find the horizontal component of the reaction force at the hinge. Answer in units of N.

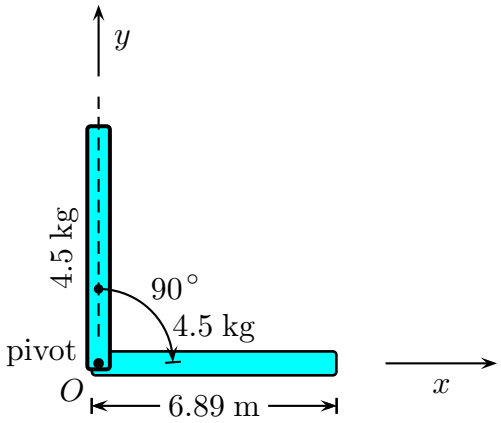
009 (part 4 of 4) 10.0 points

If the wire can withstand a maximum tension of 504 N, what is the maximum distance the bear can walk before the wire breaks? Answer in units of m.

010 (part 1 of 4) 10.0 points

A long uniform rod of length 6.89 m and mass 4.5 kg is pivoted about a horizontal, frictionless pin through one end. The rod is released from rest in a vertical position as in

the figure.



At the instant the rod is horizontal, find its angular speed. The acceleration of gravity is 9.8 m/s^2 . Answer in units of rad/s.

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011 (part 2 of 4) 10.0 points

At the same instant find the magnitude of its angular acceleration. Answer in units of rad/s^2.

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012 (part 3 of 4) 10.0 points

Still at the same instant find the magnitude of the acceleration of its center of mass. Answer in units of m/s^2.

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013 (part 4 of 4) 10.0 points

Finally, find the magnitude of the reaction force at the pivot (still at the same moment). Answer in units of N.

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014 10.0 points

Use the period of the earth (37.67 y), its mean orbital radius (1.496×10^{11} m), and the universal gravitational constant (6.673×10^{-11} N $\cdot$ m^2/kg^2) to calculate the mass of sun. Answer in units of kg.