Problem 507

The 2225-N block shown in Fig. P-507 is in contact with 45° incline. The coefficient of static friction is 0.25. Compute the value of the horizontal force P necessary to (a) just start the block up the incline or (b) just prevent motion down the incline. (c) If P = 1780 N, what is the amount and direction of the friction force? $P = 3708.55 \ \text{N}$ p= 1335 N p=708 n

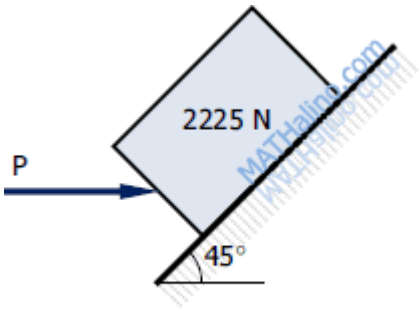

Figure P-507

The 200-lb block shown in Fig. P-508 has impending motion up the plane caused by the horizontal force of 400 lb. Determine the coefficient of static friction between the contact surfaces. U=0.66

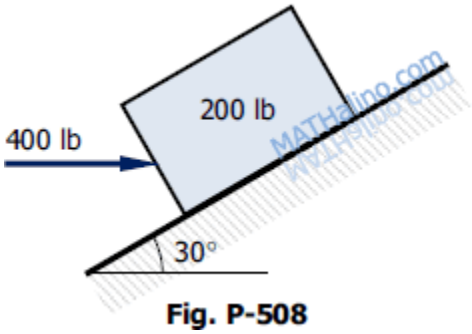

Fig. P-508

Problem 509

The blocks shown in Fig. P-509 are connected by flexible, inextensible cords passing over frictionless pulleys. At A the coefficients of friction are $\mu_s = 0.30$ and $\mu_k = 0.20$ while at B they are $\mu_s = 0.40$ and $\mu_k = 0.30$. Compute the magnitude and direction of the friction force acting on each block. TA=1800 TB=1600 FA= 480 FB=360

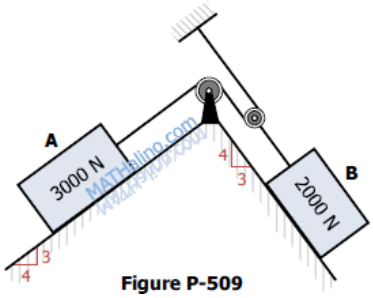

Figure P-509

Problem 510

What weight W is necessary to start the system of blocks shown in Fig. P-510 moving to the right? The coefficient of friction is 0.10 and the pulleys are assumed to be frictionless. 29.64

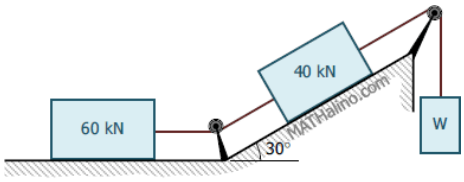

Figure P-510

Find the least value of P required to cause the system of blocks shown in Fig. P-511 to have impending motion to the left. The coefficient of friction under each block is 0.20. 12.5

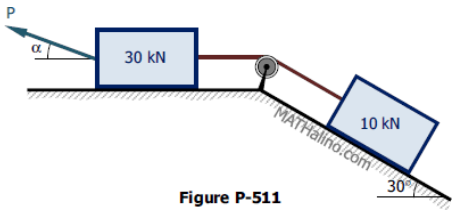

Figure P-511

A homogeneous block of weight W rests upon the incline shown in Fig. P-512. If the coefficient of friction is 0.30, determine the greatest height h at which a force P parallel to the incline may be applied so that the block will slide up the incline without tipping over.47.62

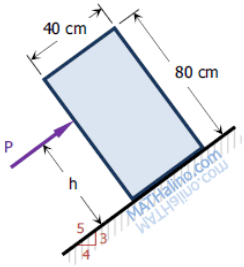

Figure P-512 and P-513

Referring to Fig. P-515 if the coefficient of friction is 0.60 and θ = 30°, what force P applied to B acting down and parallel to the incline will start motion? What is the tension in the cord attached to A?

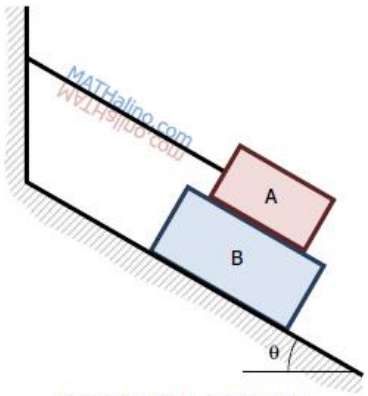

Figure P-515 and P-516

In Fig. P-519, two blocks are connected by a solid strut attached to each block with frictionless pins. If the coefficient of friction under each block is 0.25 and B weighs 2700 N, find the minimum weight of A to prevent motion. 5981.75

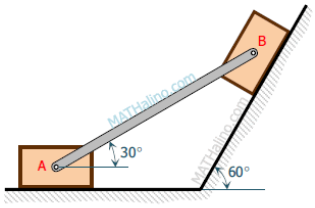

Figure P-519, P-520, and P-521

Referring to Fig. P-519, block A weighs 4 kN and B weighs 3 kN. If μ = 0.20 under B, compute the minimum coefficient of friction under A to prevent motion. 0.397

In Fig. P-519, if μ = 0.30 under both blocks and A weighs 400 lb, find the maximum weight of B that can be started up the incline by applying to A a rightward force P of 500 lb. 263.57

The blocks shown in Fig. P-522 are separated by a solid strut which is attached to the blocks with frictionless pins. If the coefficient of friction for all surfaces is 0.20, determine the value of horizontal force P to cause motion to impend to the right. Assume that the strut is a uniform rod weighing 300 lb.423.85

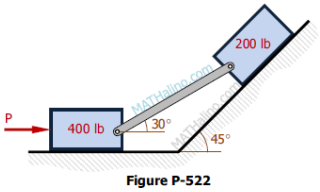

Figure P-522

A uniform ladder 4.8 m ft long and weighing W lb is placed with one end on the ground and the other against a vertical wall. The angle of friction at all contact surfaces is 20°. Find the minimum value of the angle θ at which the ladder can be inclined with the horizontal before slipping occurs.50 degrees

A ladder 6 m long has a mass of 18 kg and its center of gravity is 2.4 m from the bottom. The ladder is placed against a vertical wall so that it makes an angle of 60° with the ground. How far up the ladder can a 72-kg man climb before the ladder is on the verge of slipping? The angle of friction at all contact surfaces is 15°. 2.73m

A homogeneous cylinder 3 m in diameter and weighing 30 kN is resting on two inclined planes as shown in Fig. P-527. If the angle of friction is 15° for all contact surfaces, compute the magnitude of the couple required to start the cylinder rotating counterclockwise. 14.76kn.m

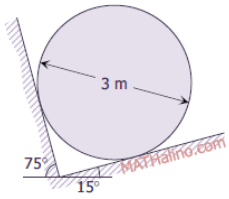

Figure P-527 and P-528

Instead of a couple, determine the minimum horizontal force P applied tangentially to the left at the top of the cylinder described in Prob. 527 to start the cylinder rotating counterclockwise.9.84kn

As shown in Fig. P-529, a homogeneous cylinder 2 m in diameter and weighing 12 kN is acted upon by a vertical force P. Determine the magnitude of P necessary to start the cylinder turning. Assume that μ = 0.30. 5.569

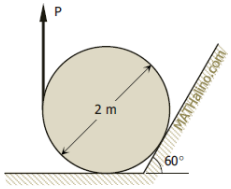

Figure P-529

Problem 536

in Fig. P-536, determine the minimum weight of block B that will keep it at rest while a force P starts blocks A up the incline surface of B. The weight of A is 100 lb and the angle of friction for all surfaces in contact is 15°.273.20

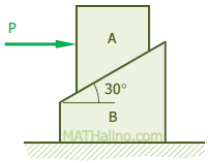

Figure P-536