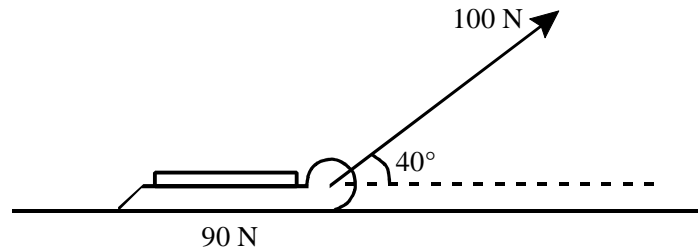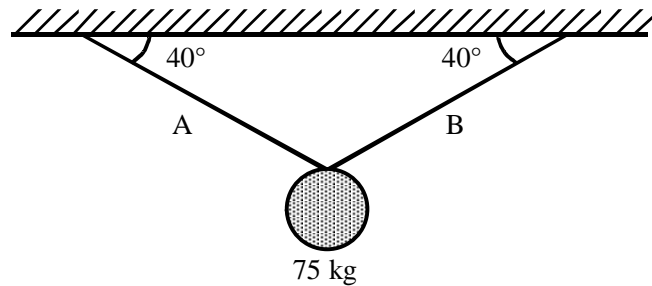# Review for Test: Advanced Forces

1)   A sled with a weight of 90 N is pulled with a force of 100 N inclined at 40° above the horizontal. The sled moves at a constant velocity.

100 N

40°

90 N

What is the magnitude of the friction force acting on the sled?

A)   64 N   C)   90 N

B)   77 N   D)   100 N

2)   The diagram below shows a large 75 kg medallion suspended from the ceiling by two chains, A and B.

40°   40°

A   B

75 kg

Which of the following represents the tension force in Chain A?

A)   1470 N   C)   735 N

B)   368 N   D)   572 N

3)   A 40.0 N force of is applied at an angle of 30° with the horizontal to a 6.0 kg block resting on a surface. The block accelerates at a rate of 3.19 m/s^2.

$F_a = 40.0$ N

30°

6.0 kg
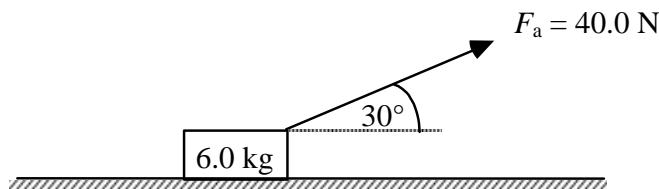
What is coefficient of friction between the surface and the block?

4) The following situation is being studied.

Adrian and Irwin conducted the investigation shown below. A 10-kg mass was suspended by a string and attached to a 5.0-kg block. The coefficient of kinetic friction between the 5.0-kg mass and the surface is 0.5.

Mass = 5 kg

$\mu_k = 0.5$

Mass = 10 kg
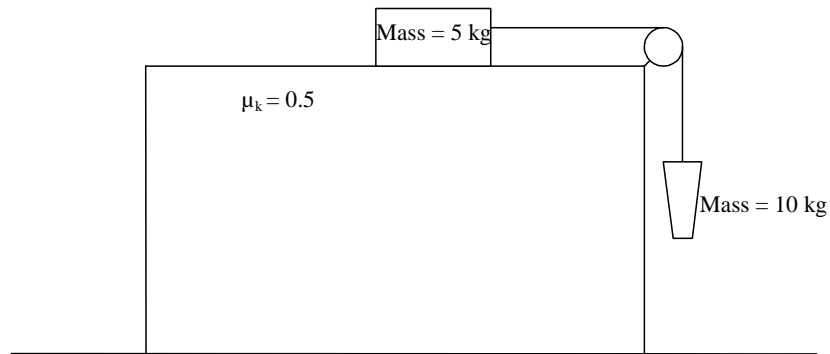
What was the acceleration of the system shown?

5) On planet Physico, a 3.0 kg mass pulls a 6.0 kg mass as is illustrated below. Friction between the 6.0 kg block and the surface is 6.3 N. The system accelerates at a rate of 1.8 m/s^2.

$\vec{a} = 1.8$ m/s^2

$F_f = 6.3$ N   6.0 kg

3.0 kg
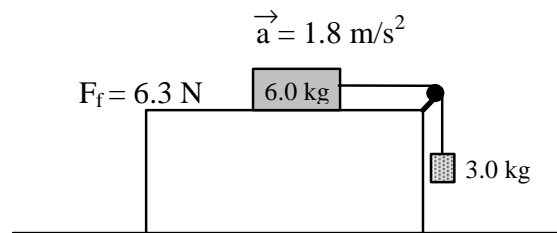
What is the acceleration due to gravity on planet Physico?

6) Two dynamometers (or spring scales) are used to suspend a 50 kg mass as shown on the diagram below. (Note: a dynamometer is a device that reads the force.)

70°

35°

50 kg
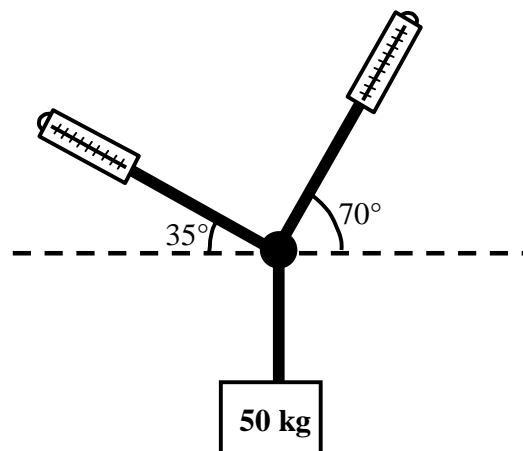
What is the reading of both dynamometers?

7) A pulley system with 3.0 kg and 2.0 kg masses is used as shown in the diagram below. The total frictional force is 5.0 N.

$$\vec{F}_f = 5.0 \text{ N}$$
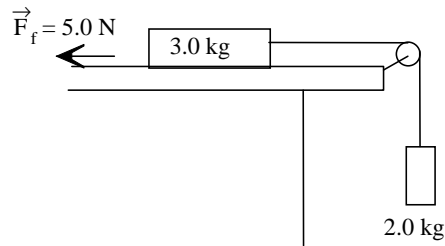
What is the tension in the string holding the two blocks together?

8) A ramp is set at 15° above the horizontal. A 125 kg box is to be moved down the ramp. A force of 250 N is applied to the box down the incline. The coefficient of friction between the box and the ramp is 0.40.
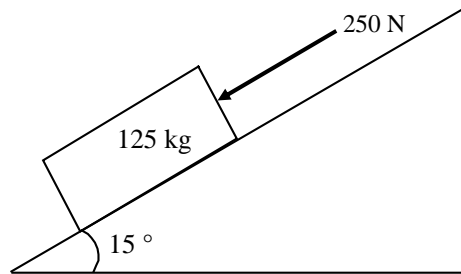
What is the acceleration of the box down the ramp?

9) A 50 kg box rests on a frictionless inclined plane. The box is also supported by a spring of constant 250 N/m.
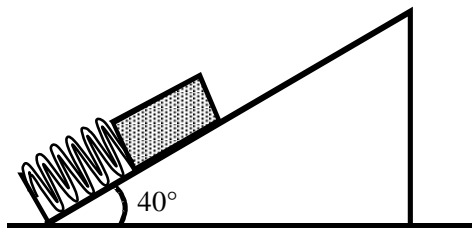

By how many centimeters is the spring being compressed?

10) Three carts, moving on a frictionless surface, are joined by strings whose masses are negligible. The carts are pull by a force of 35 N.
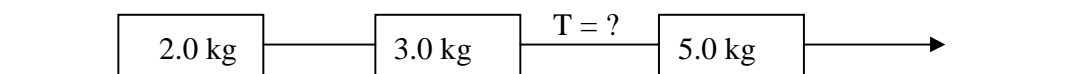

What is the tension in the string that joins the 3.0 kg mass to the 5.0 kg mass?

11) A 5.0 kg block is pulled using a force set at an angle of 40.0° above the horizontal. A force of friction of 45 N acts on the block. The block accelerates at a rate of 4.0 m/s^2.

$F_a = ?$

$F_f = 45$ N

5.0 kg

40.0°

What is the magnitude of the force used to pull the block?

12) A 2.00 kg mass is suspended between two stands. The force measured by one spring scale is 15.0 N at 30° to the horizontal.

15.0 N

30°

2.00 kg

Which reading below would appear on the second scale?

A)	17.8 N	C)	9.98 N
B)	13.4 N	D)	4.60 N

13) A 10.0 kg box starts at rest at the top of an incline that is 8.0 m long. The incline is set at 28° and it takes the box 3.0 s to slide down the length of the incline.

10.0 kg

28 °

What is the coefficient of friction between the box and the incline?

14) Scientists are planning a mission to Io, one of Jupiter's satellites. To make their work easier, the scientists have drawn a graph showing the weight F_g of different objects on the surface of Io as a function of their mass.

Weight as a function of mass
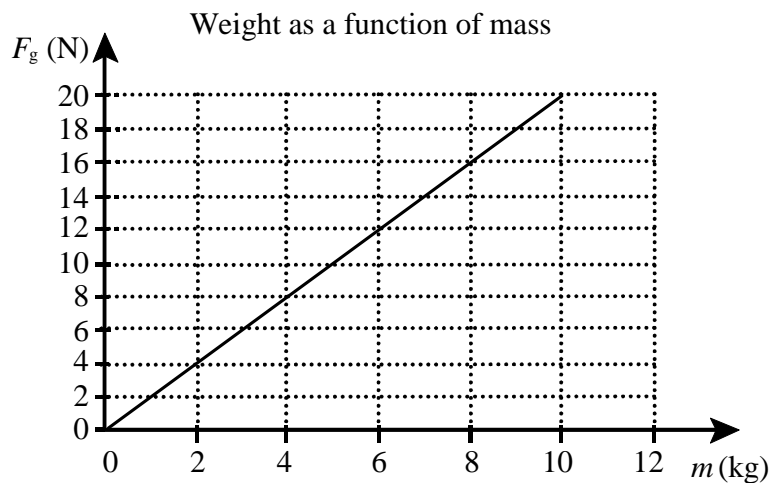
When the spaceship lands on Io, an 80-kg box containing the equipment required for the mission will be brought to the surface of the satellite by means of a ramp inclined at an angle of 30°. A cable will be used to slide the box down the ramp at a constant speed. Frictional forces are negligible.

F = ?

30°
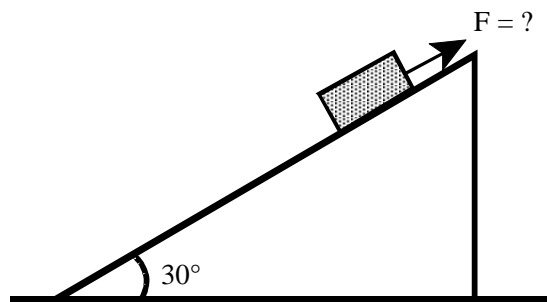
What force must be exerted on the cable so that the box can slide down at a constant speed?

15) A force of 10.0 N is applied at an angle of 30° with the horizontal to a 2.0 kg block resting on a surface. The coefficient of friction between the block and the surface is 0.15.

$F_a = 10.0$ N

30°

$\mu_f = 0.15$ 2.0 kg
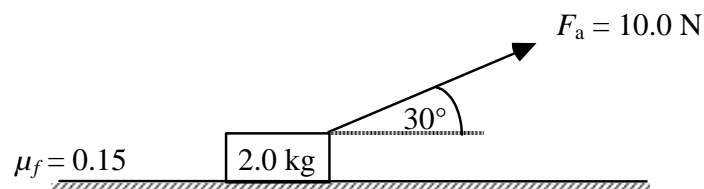
What is the magnitude of the acceleration of the block?