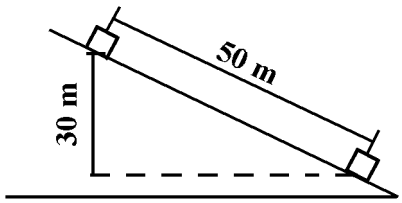
1. Base your answer to the following question on the picture below which shows a 3 kg block sliding 50 m down a frictionless inclined plane dropping a distance of 30 m.



What is the magnitude of the normal force of the plane on the block?

1) 5 N

2) 8 N

3) 16 N

4) 24 N

5) 30 N

2. A 5.0 kg object rests on a an inclined plane that makes an angle of 30º to the horizontal. The net force felt by the object is most nearly

1) 2.5 N

2) 5 N

3) 25 N

4) 50 N

5) 75 N

3. The top of a 50 m long inclined plane is 5 m off the ground. If a 10 kg mass is at the top of this plane, the net force it feels is most nearly

1) 1 N

2) 5 N

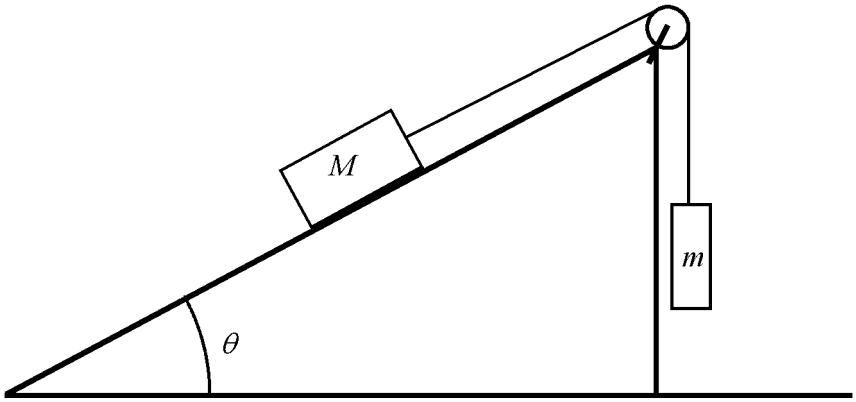
3) 10 N

4) 25 N

5) 50 N

Base your answers to questions **4** and **5** on the following.

A block of mass M on a frictionless ramp that makes an angle of θ to the horizontal. It is held at rest by a massless string which passes over a frictionless pulley and is attached to a block of mass m as shown in the diagram below.



4. The normal force on the block of mass M is

   1) $\frac{Mg}{\cos\theta}$

   2) $\frac{Mg}{\sin\theta}$

   3) Mg

   4) $Mg\cos\theta$

   5) $Mg\sin\theta$

5. The mass m is equal to

   1) $\frac{M}{\cos\theta}$

   2) $\frac{M}{\sin\theta}$

   3) $M\tan\theta$

   4) $M\cos\theta$

   5) $M\sin\theta$

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6. What force is required to push a block (mass m) up an inclined plane that makes an angle of θ with the horizon at a constant velocity, if the coefficient of friction between the plane and the block is μ?

   1) $mg(\mu\cos\theta + \sin\theta)$

   2) $mg\mu\cos\theta$

   3) $mg(\mu\sin\theta + \cos\theta)$

   4) $mg(\mu\cos\theta + \mu\sin\theta)$

   5) $g(\mu\cos\theta + m\sin\theta)$

Answer Key
First Law Tension Problems [Mar 28, 2011]

1. 4
2. 3
3. 3
4. 4
5. 5
6. 1

Name _____ Class _____ Date _____

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____