

Forces in 2D Problems

1. Two strings support a 2.58-kg sign. Each string makes an angle of 22.5° with the horizontal. Draw an FBD and determine the tension in the strings. **PSAYW**

2. A 4.82-kg flowerpot is supported by three heavy strands of rope from the ceiling. Each rope makes an angle of 72.9° with the horizontal. Determine the tension in the strings. **PSAYW**

3. A sign is hung on a string such that it hangs symmetrically at its midpoint. The angle between the string on each side of the sign is 142.9° . The tension in the string is 34.8 N. Draw an FBD and determine the mass of the sign. **PSAYW**

4. A 4.51-N force is applied at an angle of 22.9° above the horizontal to accelerate a 1.35-kg book across the table ($\mu = 0.221$). Draw an FBD and determine the acceleration of the book. **PSAYW**

5. A 353-N force is directed downward at an angle of 17.4° below the horizontal to accelerate a 20.5-kg box across the floor ($\mu=0.407$). Draw an FBD and determine the acceleration of the box. **PSAYW**

6. A 24.3-kg box slides down a surface inclined at 25.0 degrees and having a coefficient of kinetic friction of 0.405. Determine the acceleration of the box. **PSAYW**

7. A 3.20-kg box is placed on an inclined plane have an angle of incline of 36.0°. If the box accelerates down the incline at 2.67 m/s^2 , then what is the coefficient of kinetic friction? **PSAYW**

8. What force must be applied parallel to a 22.0-degree inclined plane in order to accelerate a 5.20-kg object along the incline with an acceleration of 1.92 m/s^2 ? The coefficient of kinetic friction between the object and the surface is 0.268. **PSAYW**

9. Determine the applied force required to drag a 100-N box at constant speed up a hill inclined at 30° if the coefficient of kinetic friction is 0.230. Begin by drawing a free-body diagram and organize all subsequent calculations. **PSAYW**

10. A box sits on a wood board. The coefficient of static friction between the box and the wood is 0.394. To what angle with the horizontal can the board be tilted before the box begins to slide down the incline? Start with an FBD and use your algebra skills. **PSAYW**