

#2 Forces: Statics, Pressure, and Advanced Kinetics

Equations: $F=ma$ $f = \mu F_N$ SOHCAHTOA $P = F/A$

- 1) A 600.kg sign hanging across a street from two wires. The sign is perfectly in the middle of the street and the wires form a 140° angle with each other. What is the tension in one of the wires?
- 2) What is the mass of an object that is hung with its weight distributed between 3 wires all at 120.0° angles with each other and each wire has an equal tension of 450N?
- 3) A 5.2kg box is tied with ribbon that goes around all four sides and meets in the middle at a bow. When the box is picked up with the force just under the bow, what is the tension in each ribbon if they make a 45° with the box?
- 4) A car is being raised by a tow cable that makes a 12° angle with the car. If the car weighs 20000N, then what is the tension in the cable?
- 5) My daughter is swinging on a tire swing. She has a mass of 15kg. What is the tension in the rope when she is at a 30° angle from the vertical?
- 6) What is the pressure on a surface if the mass of an object is 58kg and the area it covers is 1.2m^2 ?
- 7) What is the pressure on the ice if a 100.kg person is standing and has an area under their feet of 0.20m^2 vs. laying on the ice having an area of 2.00m^2 ?
- 8) What is the area that a 325N force is applied to an object if the pressure on the object is $525\text{N}/\text{m}^2$?
- 9) A 200.g object on a horizontal surface starts from rest and is tied to string which is tied to a 50.g weight. What is the acceleration of the object if the weight fell 45.3cm?
- 10) What is the final velocity of a 7.3kg object that is sliding down a 22° incline if the coefficient of friction is 0.12 and the object started from rest and has slid 35.3m?

Answers

- 1) 8771N
- 2) 67.5kg
- 3) 18.4N
- 4) 20447N
- 5) 173.2N
- 6) $483\text{N}/\text{m}^2$
- 7) $5000\text{N}/\text{m}^2$, $500\text{N}/\text{m}^2$
- 8) 0.62m^2
- 9) 2.0m/s
- 10) 13.63m/s