PHYSICS 11

NAME: _____

Elastic Forces (and some friction)

1. A 1.0 kg mass on a spring is 0.1 m from its equilibrium position. If the spring constant is 20.0 N/m, what is the elastic force acting on the mass?

2. The restoring force on a 0.5 kg object on a spring is 2.0 N. If the spring constant is 15 N/m, what is the displacement of the object?

3. The elastic force acting on a 0.60 kg object on a spring is 1.2 N. If the displacement of the object is 0.25 m, what is the spring constant?

4. A weight of 1.65 N will stretch a vertical spring 0.11 m. What is the spring constant?

5. A mass of 5.0 kg will stretch a vertical spring 3.25 cm. What is the spring constant?

6. A weight of 9.3 N is hung on a vertical spring that has a spring constant of 25 N/m. How far will the string stretch?

7. A 20.0 kg toboggan is pulled along by a force of 30.0 N

(a) What is the force of gravity on the toboggan?

(b) What is the coefficient of friction?

(c) How much force is needed to pull the toboggan if two 60.0 kg girls are sitting on it?

8. It takes a 5.0 N force to pull a 2.0 kg object along the ground. What is the coefficient of friction?

9. How much force does it take to pull a 100.0 kg packing crate along a rough floor, given each of the following coefficient of friction?
   (a) 0.20

   (b) 0.50

10. lf the coefficient of friction is 0.25, how much force is needed to pull each of the following masses along a rough desk?
   (a) 25 kg

   (b) 200. g

11. A 10.0 N force stretches a length of fishing line by 10.0 cm. What is the line's spring constant?

12. A 20.0 N force is used to stretch various rubber bands. Calculate the amount of stretch that will occur, given each of the following spring constant.
   (a) 100. N/m

   (b) 400. N/m

13. An archer pulls back with a force of 240. N, moving the arrow 60.0 cm. What is the spring constant of the bow?

Answers 1) 2 N, 2) 0.13 m, 3) 48 N/m, 4) 15.0 N/m, 5) 1.5x103 N/m, 6) 0.37 m, 7) 196 N, 0.153, 206 N, 8) 0.26, 9) 196 N, 490 N, 10) 61 N, 0.49 N, 11) 100 N/m, 12) 0.20 m, 0.050 m, 13) 400 N/m