HOOKE'S LAW PRACTICE
(Answers below)

Force = Spring Constant x Extension

1. What force is necessary to stretch an ideal spring with a spring constant of 120 N/m by 30 cm?

2. A spring with a spring constant of 600. N/m is used for a scale to weigh fish. What is the mass of a fish that would stretch the spring by 7.5 cm from its normal length?

3. A spring in a pogo-stick is compressed 12 cm when a 40. kg girl stands on it. What is the spring constant for the pogo-stick spring?

4. A spring is connected to a wall and a horizontal force of 80.0 N is applied. It stretches 25 cm, what is its spring constant?

5. A spring stretches 8.0 cm when a 13 N force is applied. How far does it stretch when a 26 N is applied?

6. A 7.3 kg mass is placed on a spring with a spring constant of 34 N/cm. How much does this stretch the spring?

7. An elastic cord is 80. cm long when it is supporting a mass of 10. kg hanging from it at rest. When an additional 4.0 kg is added, the cord is 82.5 cm long. What is the spring constant?

8. What is the original length of the cord (with no mass) in question 7?

9. A spring with a spring constant of 50. N/m is hanging from a stand. A second spring with a spring constant of 100. N/m is hanging from the first spring. How far do they stretch if a 0.50 kg is hung from the bottom spring?

10. What is the spring constant of the system of springs in question 9?

HOOKE'S LAW Answers

1. $F = kx = 120.\ N/m \times 0.30\ m = 36\ N$
2. $F = kx = mg \rightarrow m = kx/g = 600.\ N/m \times 0.075\ m / 10\ N/kg = 4.5\ kg$
3. $F = kx = mg \rightarrow k = mg/x = 40.\ Kg \times 10\ N/kg / 0.12\ m = 3300\ N/m$
4. $F = kx \rightarrow k = F/x = 80.\ N / 0.25\ cm = 320\ N/m$
5. $F = kx \rightarrow k = F_1/x_1 = F_2/x_2 \rightarrow x_2 = x_1F_2/F_1 = 8.0\ cm \times 26\ N / 13\ N = 16\ cm$
6. $F = kx = mg \rightarrow x = mg/k = 7.3\ kg \times 10\ N/kg / 34\ N/cm = 2.1\ cm = 0.021\ m$
7. $F = kx = mg \rightarrow k = mg/x = 4.0\ kg \times 10\ N/kg / 0.0025\ m = 1600\ N/m$
8. $F = kx = mg \rightarrow x = mg/k = 10\ kg \times 10\ N/kg / 1600\ N/m = 6.25\ cm$; $80.\ cm - 6.25\ cm = 74\ cm$
9. $F = kx = mg \rightarrow x = mg/k_1 + mg/k_2 = (0.50\ kg \times 10\ N/kg / 50.\ N/m) + (0.50\ kg \times 10\ N/kg / 100.\ N/m) = 0.15\ m$
10. $F = kx = mg \rightarrow k = mg/x = 0.50\ kg \times 10\ N/kg / 0.15\ m = 33\ N/m$