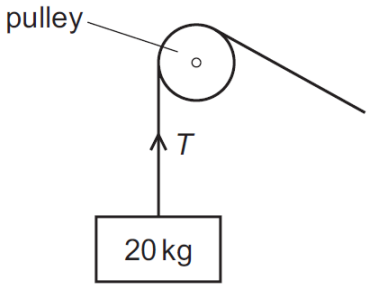
Forces – 2019 June

1. 0625/11/M/J/19/No.7

A mass of 20 kg is held stationary by a rope passing over a frictionless pulley.

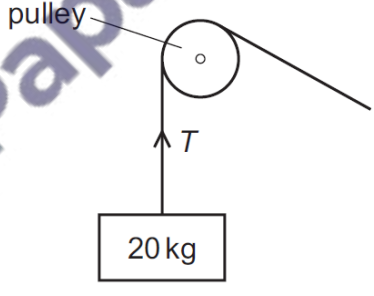


What is the tension *T* in the rope?

A 10 kg **B** 20 kg **C** 100 N **D** 200 N

2. 0625/21/M/J/19/No.7

A mass of 20 kg is held stationary by a rope passing over a frictionless pulley.

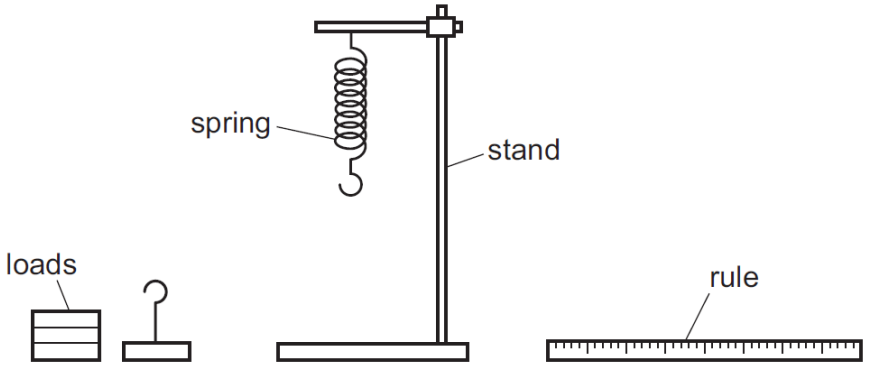


What is the tension *T* in the rope?

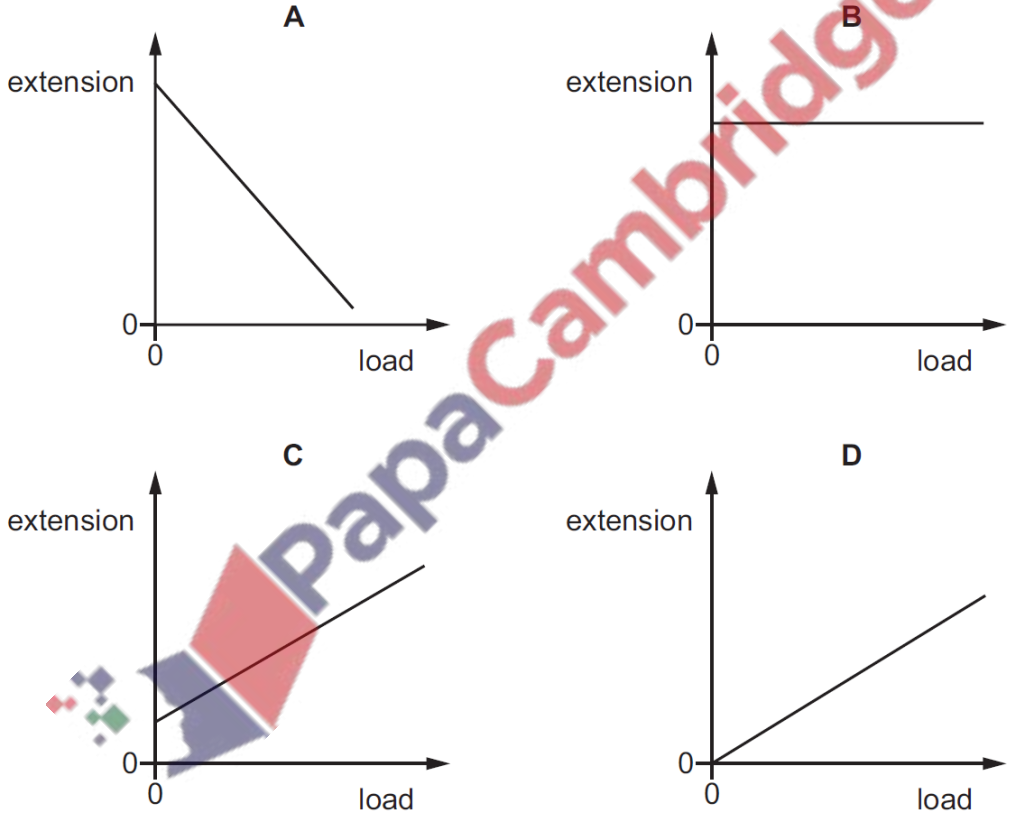
A 10 kg **B** 20 kg **C** 100 N **D** 200 N

3. 0625/11$12$13/M/J/19/No.8

A spring is suspended from a stand. Loads are added and the extensions are measured.



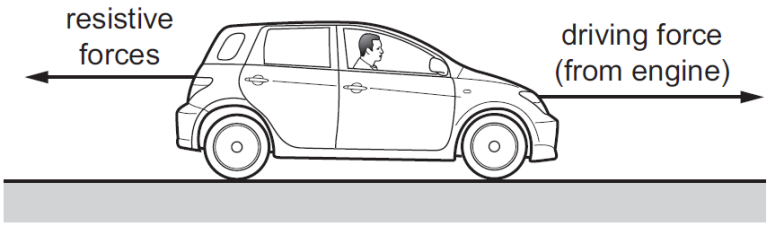
Which graph shows the result of plotting extension against load?



4. 0625/13,23/M/J/19/No.7

A car is driven from rest on a long straight road. The car engine exerts a constant driving force.

The diagram shows the horizontal forces acting on the car. The resistive forces are proportional to the speed of the car.



Why does the car eventually reach a maximum speed?

A The resistive forces decrease to make the acceleration of the car negative.

B The resistive forces decrease to make the acceleration of the car zero.

C The resistive forces increase to make the acceleration of the car negative.

D The resistive forces increase to make the acceleration of the car zero.

5. 0625/21/M/J/19/No.6

A student wishes to determine the spring constant of a spring where it obeys Hooke's law.

Different loads are hung from the spring and its length is measured for each different load.

The table shows the results of the experiment.

weight of load / N	0	2.0	4.0	5.0
length of spring / cm	12	20	28	38

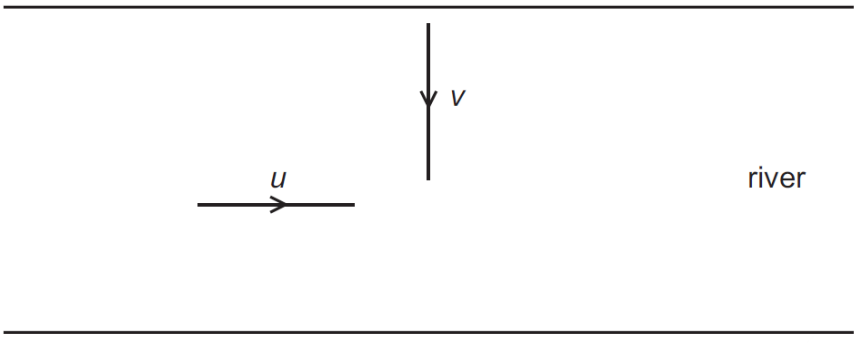
What is the value of the spring constant of the spring?

A 0.13 N / cm **B** 0.14 N / cm **C** 0.19 N / cm **D** 0.25 N / cm

6. 0625/21/M/J/19/No.8

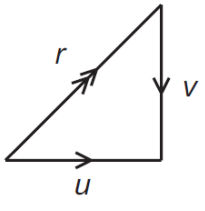
A boat starts moving across a river at velocity v perpendicular to the river bank.

The boat encounters a current along the river of velocity u, as shown.

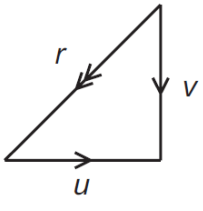


Which vector diagram shows the resultant velocity r of the boat?

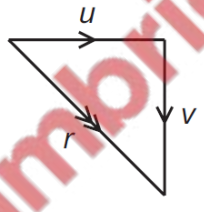
A



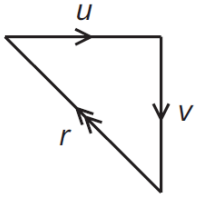
B



C



D

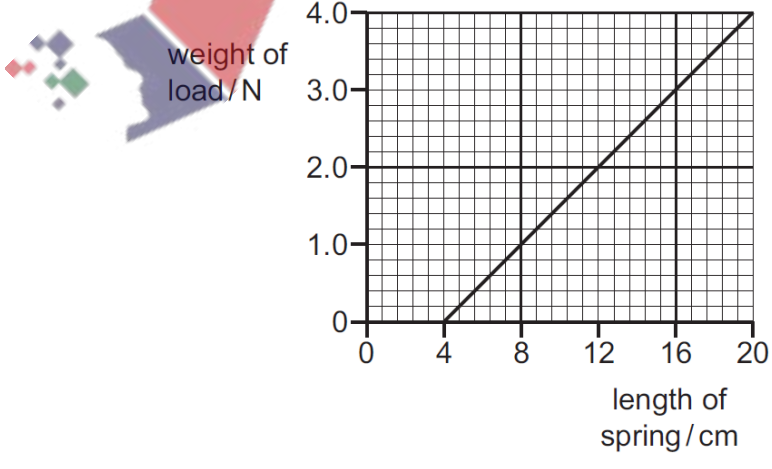


7. 0625/22/M/J/19/No.6

An experiment is done to determine the spring constant for a spring.

Different loads are hung from the spring and its length is measured for each different load.

The graph shows how its length varies with load.



What is the value of the spring constant?

A 0.20 N / cm **B** 0.25 N / cm **C** 4.0 N / cm **D** 5.0 N / cm

8. 0625/23/M/J/19/No.4

On Earth, a spring stretches by 5.0 cm when a mass of 3.0 kg is suspended from one end.

The gravitational field strength on the Moon is $\frac{1}{6}$ of that on Earth.

Which mass, on the Moon, would stretch the spring by the same extension?

A 0.50 kg **B** 3.0 kg **C** 5.0 kg **D** 18 kg

9. 0625/23/M/J/19/No.6

An experiment is carried out to determine the spring constant for a spring that obeys Hooke's law.

A load is hung from the spring and the extension of the spring is measured.

Which calculation is used to calculate the spring constant?

A $\frac{\text{extension}}{\text{mass of the load}}$

B $\frac{\text{extension}}{\text{weight of the load}}$

C $\frac{\text{mass of the load}}{\text{extension}}$

D $\frac{\text{weight of the load}}{\text{extension}}$

10. 0625/12/F/M/19/No.7

Which property of an object **cannot** be changed by applying forces?

A mass

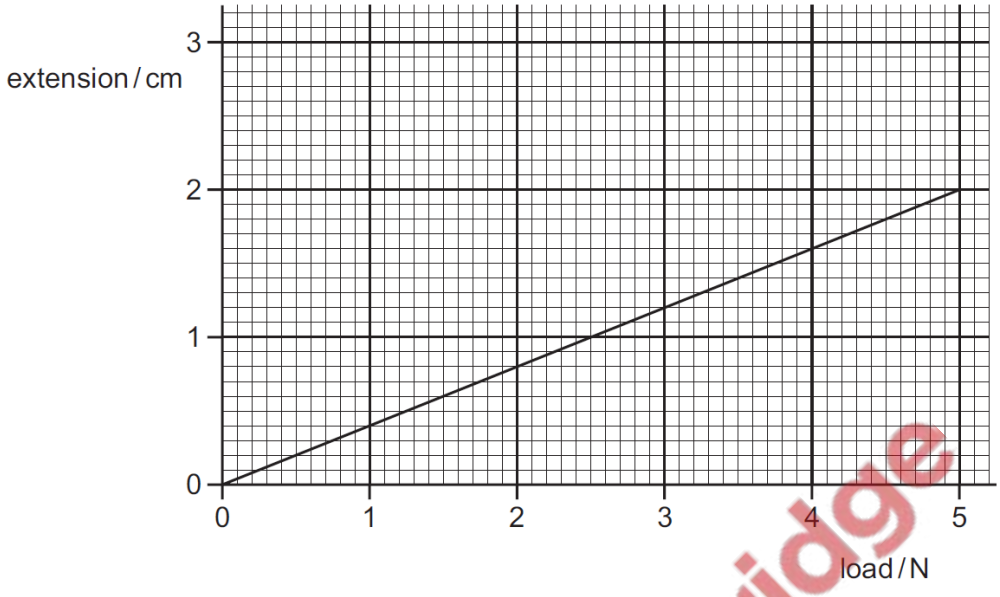
B shape

C speed

D volume

11. 0625/12, 22/F/M/19/No.8, 7

The extension / load graph for a spring is shown. The unstretched length of the spring is 15.0 cm.



When an object of unknown weight is suspended on the spring, the length of the spring is 16.4 cm.

What is the weight of the object?

A 0.55 N **B** 0.67 N **C** 3.5 N **D** 4.1 N

12. 0625/22/F/M/19/No.8

A box of mass 2.0 kg is pulled across the floor by a force of 6.0 N.

The frictional force acting on the box is 1.0 N.

What is the acceleration of the box?

A 0.40 m / s^2 **B** 2.5 m / s^2 **C** 3.0 m / s^2 **D** 3.5 m / s^2

13. 0625/22/F/M/19/No.9

Which moving body has a resultant force acting on it?

A a diver rising vertically through water at constant speed

B an aircraft circling an airport at constant speed

C a train going up a straight incline at constant speed

D a parachutist descending vertically at terminal velocity