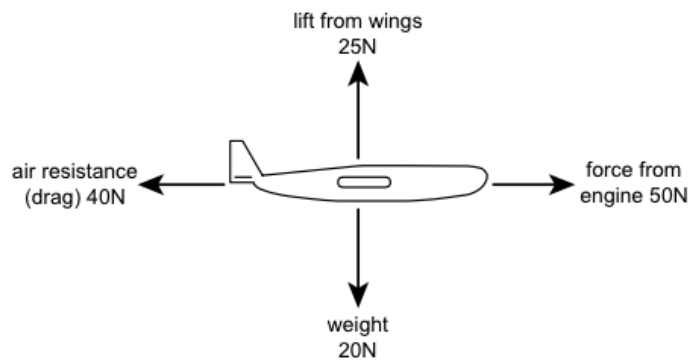


Forces

- 8 The mean mass of a group of N people is 75 kg.
- Jim, Karen and Leroy join this group, without anyone leaving; the new mean mass is 78 kg.
- The mean mass of Jim, Karen and Leroy is 90 kg.
- What is the value of N ?
- A** 4
- B** 12
- C** 15
- D** 30
- E** 48
- F** 90

2016

- 15 The diagram shows the only four forces acting on a model aircraft of mass 2.0 kg whilst flying.



Which line in the table states the horizontal and vertical accelerations of the aircraft at this instant?

	Horizontal acceleration	Vertical acceleration
A	5.0 m/s^2 to the right	2.5 m/s^2 upwards
B	5.0 m/s^2 to the right	10 m/s^2 downwards
C	5.0 m/s^2 to the right	zero
D	25 m/s^2 to the right	10 m/s^2 downwards
E	25 m/s^2 to the right	2.5 m/s^2 upwards
F	25 m/s^2 to the right	zero
G	zero	2.5 m/s^2 upwards
H	zero	10 m/s^2 downwards

2015

Forces

- 11 The diagrams show, not to scale, three different situations in which a force F acts. Also shown in each case is a distance d .

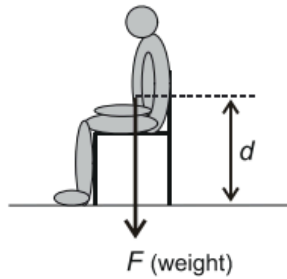


Diagram 1:
Person sitting on a chair

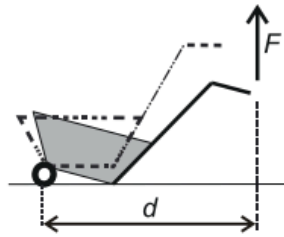


Diagram 2:
Wheelbarrow being lifted

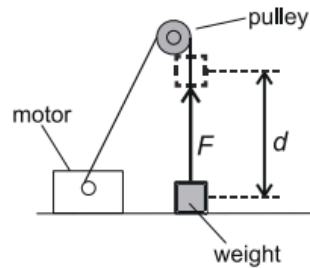


Diagram 3:
Weight being lifted by a motor

Which line in the table shows whether or not work is being done by force F in each situation and, if so, whether the work done is equal to $F \times d$?

	Work being done by force F ?	Work done = $F \times d$?
A	only in diagrams 1 and 2	only in diagram 1
B	only in diagrams 1 and 2	only in diagram 2
C	only in diagrams 2 and 3	only in diagram 2
D	only in diagrams 2 and 3	only in diagram 3
E	in diagrams 1, 2 and 3	only in diagrams 1 and 2
F	in diagrams 1, 2 and 3	only in diagrams 2 and 3
G	only in diagrams 1 and 3	only in diagram 1
H	only in diagrams 1 and 3	only in diagram 3

2012

- 15 A bullet of mass 50g is fired from a rifle with a velocity of 300m/s. It hits a bank of earth and after travelling 60cm into the bank comes to rest.

What is the average stopping force of the earth in the bank on the bullet?

- A 37.5N
- B 3.75×10^3 N
- C 3.75×10^4 N
- D 3.75×10^6 N

2011

Forces

- 3 Shortly after opening her parachute, a free-fall parachutist of mass 60kg experiences the forces shown in the diagram.

drag (air resistance) = 900N



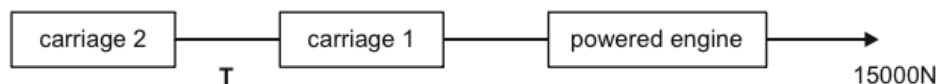
weight = 600N

Which line in the table gives the size and direction of the acceleration of the parachutist at this instance?

	size of acceleration (m/s^2)	direction of acceleration
A	5.0	downwards
B	10.0	downwards
C	5.0	upwards
D	10.0	upwards
E	0.0	-

2009

- 23 A train consists of a powered engine pulling two unpowered carriages.



The engine has a mass of 20000kg, and each carriage has a mass of 5000kg. When the engine accelerates from rest it develops a thrust (driving force) of 15000N as shown.

Ignoring resistive forces, what is the tension (pulling force) **T** in the coupling between carriage 1 and carriage 2?

- A 2500N
- B 3750N
- C 5000N
- D 7500N
- E 15000N

2009