

Variation 2

1. P varies directly as the square of Q. What will happen to P if Q is multiplied by 3?

2. A varies directly as B and inversely as the square of C. If B is multiplied by 16 and C is multiplied by 2, what effect will this have on A?

3. M varies as the cube of N and inversely as P. If N is multiplied by 2 and P is halved, what happens to M?

4. T varies as the square of U and as V. What happens to T when U is trebled and V is doubled?

5. A weight on the end of a string is spun in a circle on a smooth table. The tension, T, in the string varies directly as the square of the speed, v, and inversely as the radius, r, of the circle.
 - (a) Write down a formula for T in terms of v and r.
 - (b) The speed of the weight is multiplied by 3 and the radius of the string is halved.
What happens to the tension of the spring?

6. The number of letters, N, which can be typed on a sheet of paper varies inversely as the square of the size, s, of the letters used.
 - (a) Write down a relationship connecting N and s.
 - (b) The size of the letters is doubled.
What effect does this have on the number of letters which can be typed on a sheet of paper?

7. The weight, W kilograms, of a cylindrical pole varies as its length, L centimetres and as the square of its diameter, D centimetres.
 - (a) Write down a formula connecting W, L and D.
 - (b) If L is doubled and D is halved, what happens to W?

8. The force, F newtons, needed to stop a train varies as the square of the speed, S kmph, of the train and inversely as the stopping distance, D metres.

- (a) Write down an expression connecting F , S and D .
(b) What happens to F if S is multiplied by 4 and D stays the same?

9. The electrical resistance, R , of copper wire varies directly as its length, L metres, and inversely as the square of its diameter, d millimetres.

Two lengths of copper wire, A and B , have the same resistance.

Wire A has a diameter of 2mm and a length of 3m.

Wire B has a diameter of 3mm.

What is the length of wire B ?

10. The time, t seconds, taken by a child to slide down a chute varies as the length, L metres of the chute and inversely as the square root of the height, H metres, of the chute above the ground.

Two chutes are in a playground. It takes the same time to slide down both chutes.

One chute is 6 metres long and is 2.56 metres above the ground.

The second chute is 3.24 metres above the ground.

What is the height of the second chute?

11. The number of litres of petrol, L , used by a car on a journey varies as the distance, D km, travelled and as the square root of the average speed, S kmph.

Two cars used the same amount of petrol for different journeys.

Car M travelled 200 km at an average speed of 81 kmph.

Car N travelled 240 km.

Calculate the average speed of car N .

12. The safe load, W kg, of a beam supported at each end varies as the breadth of the beam, B cm, and as the square of its depth, D cm.

Two different beams can carry the same load safely.

The first beam has a breadth of 10 cm and a depth of 8 cm.

The second beam has a depth of 5 centimetres.

Find the breadth of the second beam.