

Direct Variation


1. If y varies directly as x and $y = 12$ when $x = 3$, find an equation relating y and x .
Use this equation to find y when $x = 9$.

 2. A varies directly as B^2 and $A = 24$ when $B = 2$. Find A when $B = 5$.


 3. p varies as the square root of q . When $p = 4$, $q = 64$. Find an equation connecting p and q and hence find p when q is 256.

 4. The distance, s metres, through which a heavy body falls from rest varies as the square of the time, t seconds, taken. After 2 seconds the body will have fallen 20 metres approximately.
How far will the body fall in 8 seconds?

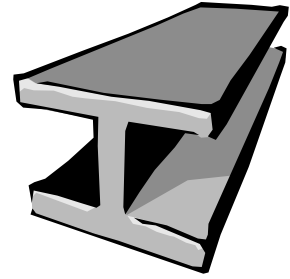
 5. The safe speed, v metres per second, at which a train can round a curve varies directly with the radius of the bend of the curve, r metres.
If the safe speed for a curve with radius 100 metres is 20 metres per second, calculate the safe speed for a curve with radius 86 metres.
Give your answer to the nearest whole number.

 6. The cost, £ C , of producing a book varies directly as the square root of the number of pages, N , in the book.
A book with 121 pages costs £1.65 to produce.
Find the cost of producing a book with 576 pages.
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7. A pizza shop prices its pizzas according to size. The price, £ P , of a pizza varies directly as the square of the diameter, D inches, of the pizza.
If a pizza of diameter 8 inches costs £1.60, what should a 14 inch pizza cost?

 8. The energy content of food, E kilojoules, varies directly as the weight of the food, W grams. 90 grams of cheese has an energy content of 1503 kilojoules.
What is the energy content of a piece of the same cheese which weighs 250 grams?

 9. The speed, v centimetres per second, at which a tuna fish swims varies directly as the square root of its length, L centimetres.
A tuna fish of length 3.6 metres can swim at a speed of 45 cm/s.
At what speed could a tuna fish of length 4 metres swim?
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10. For a metal beam supporting a weight at its midpoint, the sag, S millimetres, varies as the cube of its length, L centimetres. For a beam of length 4 metres the sag is 2 millimetres. Write down a formula connecting S and L and hence find the sag when the beam is 3.5 metres long.



11. The tension t newtons in a spring varies directly as the extension, e centimetres, of the spring. A tension of 24 newtons stretches a certain spring 4.5 cm. How many newtons would be needed to stretch the same spring 2.8 cm?
12. The value, $\pounds V$, of a diamond varies directly as the square of its weight, C carats. A diamond weighing 2 carats is worth $\pounds 1200$. Calculate the value of a diamond weighing 5 carats.
13. The amount of hydrogen, H grams, given off when calcium is added to water varies directly as the weight, W grams, of calcium added. 140 grams of calcium produce 7 grams of hydrogen. Find a formula connecting H and W and use this formula to find the weight of hydrogen produced by 300 grams of calcium.
14. The resistance, R newtons, to the motion of a train varies directly as the square root of the speed of the train, V metres per second. At a speed of 25mps the resistance is 3600 newtons. Calculate the resistance at a speed of 100 mps.

