Block on a Rough Table

A Level

This problem involves <u>friction</u>, which is not covered in some Physics A Levels. For more information please check with your teacher.

A block is being pulled along a rough table at constant speed by a horizontal force of magnitude F . The block has mass $m = 2.0\,\mathrm{kg}$ and the coefficient of dynamic friction between the block and the table is $\mu = 0.50$.

(Take $g = 9.81\,\mathrm{m\,s^{-2}}$) .

Find F .

Created for isaacphysics.org by Phil Sansom.
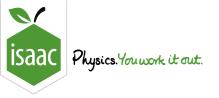
Essential GCSE Physics 7.4

Year 9   GCSE

The number of widgets made in a factory each week is proportional to the number of workers and the number of hours each worker works. When the factory employed $25\,\text{staff}$, each working $35\,\text{hours}\,/\,\text{week}$, $65\,400\,\text{widgets}$ were made each week.

Part A 40 **staff for** 30 **hours/week**

How many widgets would be made each week if 40 staff worked for 30 hours per week?

Part B 130000 **widgets**

If we need $130\,000\,\text{widgets}$ made each week, and the staff will work $42\,\text{hours}\,/\,\text{week}$, how many workers are needed?

Essential Pre-Uni Physics A10.1

GCSE   A Level

If $V \propto I$ and $I = 0.35\,\text{A}$ when $V = 9.6\,\text{V}$, what will V be when $I = 0.90\,\text{A}$?

Essential Pre-Uni Physics A10.3

If $g \propto 1/r^2$ and $g = 9.8\,\text{N kg}^{-1}$ when $r = 6400\,\text{km}$, what will g be when $r = 15000\,\text{km}$?

Essential Pre-Uni Physics A10.4

GCSE   A Level

If $E \propto x^2$ and $E = 2.5\,\text{J}$ when $x = 1.5\,\text{cm}$, what will x be when $E = 6.0\,\text{J}$?

Essential Pre-Uni Physics A10.9

If $R = \rho L/A$, and $R = 5.0\,\Omega$ when $L = 65\,\mathrm{m}$ and $A = 2.5\,\mathrm{mm}^2$, what will R be when $L = 120\,\mathrm{m}$ and $A = 1.5\,\mathrm{mm}^2$ if ρ doesn't change?

Essential Pre-Uni Physics A9.1

Give the factor by which the quantity changes to two significant figures. So if it doubles, your answer is 2.0, and if it halves your answer is 0.50.

By what factor does $E = mv^2/2$ change if v doubles?

Essential Pre-Uni Physics A9.10

Give the percentage change (to two significant figures) in the quantity. Use "$+$" or "$-$" to indicate increase or decrease (so a $3.0\,\%$ decrease would be given as $-3.0\,\%$).

Part A   Percentage change in E

In $E = VIt$, what is the percentage change in E if V increases by $1.0\,\%$, I decreases by $2.0\,\%$ and t increases by $3.0\,\%$?

Part B   Percentage change in R

In $R = \rho L/A$, what is the percentage change in R if L increases by $7.0\,\%$ and A increases by $3.0\,\%$?

Essential Pre-Uni Physics A9.2

Give the factor by which the quantity changes to two significant figures. So if it doubles, your answer is 2.0, and if it halves your answer is 0.50.

Part A r **is multiplied by** 3.3

By what factor does $V = -GM/r$ change if r is multiplied by 3.3?

Part B r **is multiplied by** 0.64

By what factor does $g = GM/r^2$ change if r is multiplied by 0.64?

Essential Pre-Uni Physics A9.4

Give the factor by which the quantity changes to two significant figures. So if it doubles, your answer is 2.0, and if it halves your answer is 0.50.

By what factor does d need to change in $I = P/(4\pi d^2)$ if P were multiplied by 5.2 and I were to not change?