

### Answer on Question#68280-Physics / Other

A block of mass  $m = 3$  kg compresses a horizontal spring by  $x = 0.4$  m. When it is released the block moves across a horizontal plain a distance of  $s = 2.4$  m before coming to rest. If the coefficient of friction between the block and the table is  $\mu = 0.3$ , what is the force constant?

#### Solution

The change of energy is equal to work done

$$\frac{kx^2}{2} = \mu mgs.$$

So

$$k = \frac{2\mu mgs}{x^2},$$

$$k = \frac{2 \times 0.3 \times 3 \times 9.8 \times 2.4}{0.4^2} = 264.6 \frac{\text{N}}{\text{m}}.$$

**Answer** =  $264.6 \frac{\text{N}}{\text{m}}$ .

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