

## Complete Solutions to Physics Problems

Physics students frequently solve problems on exams and on other assignments. Physics teachers frequently insist students show how they solved the problems to earn full credit. Although the expectations of teachers may vary, this page shows a complete solution as presented in many textbooks, and as expected by many teachers.

Problem: A 50 kg mass is moving in a straight line at 10 m/s. What is the kinetic energy of of the object?

- 1) Write out the equation that is necessary to solve the equation:

$$KE = \frac{1}{2} m v^2$$

- 2) Rewrite the equation with the quantities given in the problem inserted:

$$KE = \frac{1}{2} (50\text{kg})(10\text{m/s})^2$$

Notice the units were included.

- 3) Finish the calculation, and make sure to include SI units in the answer:

$$KE = 2500 \text{ J}$$

Sometimes the problem requires the students to rewrite the equation to solve for a different variable. In that case, another step is added to show how the original equation was rewritten:

Problem: The head 50 kg head of an electric hammer must have 2500 J of energy to drive a spike. What is the minimum speed at which it must strike the spike?

$$KE = \frac{1}{2} m v^2$$

$$v = \sqrt{2 \frac{(KE)}{m}}$$

$$v = \sqrt{2 \frac{(2500\text{J})}{50\text{kg}}}$$

$$v = 10\text{m/s}$$