9. We choose $+x$ as the direction of motion (so $\vec{a}$ and $\vec{F}$ are negative-valued).

   (a) Newton's second law readily yields $\vec{F} = (85\,\text{kg})(-2.0\,\text{m/s}^2)$ so that $F = |\vec{F}| = 170$ N.

   (b) From Eq. 2-16 (with $v = 0$) we have

$$0 = v_0^2 + 2a\Delta x \quad \Longrightarrow \quad \Delta x = -\frac{(37\,\text{m/s})^2}{2(-2.0\,\text{m/s}^2)}$$

   which gives $\Delta x = 3.4 \times 10^2$ m. Alternatively, this can be worked using the work-energy theorem.

   (c) Since $\vec{F}$ is opposite to the direction of motion (so the angle ϕ between $\vec{F}$ and $\vec{d} = \Delta x$ is $180°$) then Eq. 7-7 gives the work done as $W = -F\Delta x = -5.8 \times 10^4$ J.

   (d) In this case, Newton's second law yields $\vec{F} = (85\,\text{kg})(-4.0\,\text{m/s}^2)$ so that $F = |\vec{F}| = 340$ N.

   (e) From Eq. 2-16, we now have

$$\Delta x = -\frac{(37\,\text{m/s})^2}{2(-4.0\,\text{m/s}^2)} = 1.7 \times 10^2 \text{ m} .$$

   (f) The force $\vec{F}$ is again opposite to the direction of motion (so the angle ϕ is again $180°$) so that Eq. 7-7 leads to $W = -F\Delta x = -5.8 \times 10^4$ J. The fact that this agrees with the result of part (c) provides insight into the concept of work.