Work → $W = F_{\parallel} \Delta d$

$W = F \Delta d \cos\theta$

W = area under F-d graph

$W = \Delta E$ (Work Energy)

Energy → $E_k = \frac{1}{2}mv^2$

$E_g = mgh$

$E_e = \frac{1}{2}kx^2$ $(F_a = kx)$

Example

Gabe pushes the grocery cart with a force of 55N at a 40° to the horizontal down an aisle at the SuperStore that is 15.0m long. How much work does he do?

$W = F \Delta d \cos\theta$

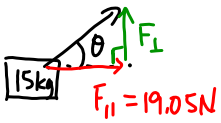
$W = (55N)(15.0m)\cos 40^\circ$

$W = 6.3 \times 10^2 J$

Gabe does 6.3×10^2 J of work.

p276

22.



$F_{net} = ma$

$F_{\parallel} = ma$

$F_{\parallel} = (15kg)(1.27 m/s^2)$

$F_{\parallel} = 19.05N$

$\cos\theta = \frac{F_{\parallel}}{F}$ $\left(\frac{adj}{hyp}\right)$

$\cos\theta = \frac{19.05N}{65N}$

$\theta = \cos^{-1}\left(\frac{19.05N}{65N}\right)$

$\theta = 73^\circ$