(57) (a) $\Delta\vec{r} = \vec{r}_f - \vec{r}_i = \langle 4,0,2\rangle m - \langle 2,0,3\rangle m = \langle 2,0,-1\rangle m$

$W_{Jack} = \vec{F}\cdot\Delta\vec{r} = (-400)(2) + (0)(0) + (200)(-1) = -1000\,J$

(b) $W_{Jill} = \vec{F}\cdot\Delta\vec{r} = (150)(2) + (0)(0) + (300)(-1) = 0$

(c) $90^\circ$, because $W = 0$ and $|\vec{F}| \neq 0$, $|\Delta\vec{r}| \neq 0$

(d) $W_{net} = W_{Jack} + W_{Jill} = -1000\,J = \Delta K = K_f - K_i$

$K_{init} = \frac{1}{2}mv^2 = \frac{1}{2}(3000\,kg)(1.3\,m/s)^2 = 2535\,J$

$K_f = K_i + W_{net} = 2535\,J - 1000\,J = 1535\,J$

$v_f = \sqrt{\frac{2K_f}{m}} = 1.0\ m/s$

(60) $W_{net} = (34N)(2m) + (13N)(6m) - (40N)(2m) = 66\,J$

(61) $W_{net} = (180N)(6m) - (170N)(4m) = 400\,J$

$K_i = \frac{1}{2}mv^2 = \frac{1}{2}(100\,kg)(3.5\,m/s)^2 = 612.5\,J$

$K_f = K_i + W_{net} = 1012.5\,J$

$v_f = \sqrt{\frac{2K_f}{m}} = \sqrt{\frac{2(1012.5\,J)}{100}} = 4.5\ m/s$