

Work Done by a Force:

Part A: $W = \vec{F}_{||} \vec{d}$ is

① $W = \vec{F}_{||} \vec{d}$
 $W = 45\text{N}(3.0\text{m})$
 $W = 135\text{J}$
 $W = 140\text{J}$

② $W = \vec{F}_{||} \vec{d}$
 $W = 45\text{N}(3.0\text{m})$
 $W = -135\text{J}$
 $W = -140\text{J}$

③ $W = \vec{F}_{||} \vec{d}$
 $W = 0\text{N}(3.0\text{m})$
 $W = 0\text{J}$

④ $W = \vec{F}_{||} \vec{d}$
 $W = 45\text{N}\cos 49^\circ(3.0\text{m})$
 $W = 88.5679\dots\text{J}$
 $W = 89\text{J}$

⑤ $W = \vec{F}_{||} \vec{d}$
 $W = 45\text{N}\cos 49^\circ(3.0\text{m})$
 $W = -88.5679\dots$
 $W = -89\text{J}$

⑥ $W = \vec{F}_{||} \vec{d}$
 $W = 65\text{N}\cos 39^\circ(1.1)$
 $W = 55.5659\dots$
 $W = 56\text{J}$

⑦ $W = \vec{F}_{||} \vec{d}$
 $W = 112\text{N}\cos 29^\circ(14\text{m})$
 $W = -1371.403\dots$
 $W = -1400\text{J}$

⑧ $W_1 = \vec{F}_{1||} \vec{d}$ $W_2 = \vec{F}_{2||} \vec{d}$
 $W_1 = 17\text{N}(3.0\text{m})$ $W_2 = (-17\text{N})(3.0\text{m})$
 $W_1 = 51\text{J}$ $W_2 = -51\text{J}$

⑨ $W_1 = \vec{F}_{1||} \vec{d}$
 $W_1 = 128\text{N}(12.0\text{m})$
 $W_1 = 1636\text{J}$
 $W_1 = 1540\text{J}$

$W_2 = \vec{F}_{2||} \vec{d}$
 $W_2 = (-210\text{N}\cos 31^\circ)(12.0\text{m})$
 $W_2 = -2160.061598\text{J}$
 $W_2 = -2200\text{J}$

$W_3 = \vec{F}_{3||} \vec{d}$
 $W_3 = (-99\text{N}\sin 64^\circ)(12.0\text{m})$
 $W_3 = -1067.767327$
 $W_3 = -1100\text{J}$

⑩ ⑧ $W_{\text{net}} = W_1 + W_2 = 0\text{J}$

⑨ $W_{\text{net}} = W_1 + W_2 + W_3 = -1691.82\dots\text{J}$
 $= -1700\text{J}$

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Part B: $W = Fd \cos \theta$

① $W = Fd \cos \theta$
 $W = 45\text{N}(3.0\text{m}) \cos 0^\circ$
 $W = 135\text{J}$
 $W = 140\text{J}$

② $W = Fd \cos \theta$
 $W = 45\text{N}(3.0\text{m}) \cos 180^\circ$
 $W = -135\text{J}$
 $W = -140\text{J}$

③ $W = Fd \cos \theta$
 $W = 45\text{N}(3.0\text{m}) \cos 90^\circ$
 $W = 0\text{J}$

④ $W = Fd \cos \theta$
 $W = 45\text{N}(3.0\text{m}) \cos 49^\circ$
 $W = 88.567 \dots \text{J}$
 $W = 89\text{J}$

⑤ $W = Fd \cos \theta$
 $W = 45\text{N}(3.0\text{m}) \cos 131^\circ$
 $W = -88.567 \dots \text{J}$
 $W = -89\text{J}$

⑥ $W = Fd \cos \theta$
 $W = 65\text{N}(1.1\text{m}) \cos 39^\circ$
 $W = 55.56 \dots \text{J}$
 $W = 56\text{J}$

⑦ $W = Fd \cos \theta$
 $W = 112\text{N}(14\text{m}) \cos 151^\circ$
 $W = -1371.4037 \dots$
 $W = -1400\text{J}$

⑧ $W_1 = F_1 d \cos \theta_1$
 $W_1 = 17\text{N}(3.0\text{m}) \cos 0^\circ$
 $W_1 = 51\text{J}$

$W_2 = F_2 d \cos \theta_2$
 $W_2 = 17\text{N}(3.0\text{m}) \cos 180^\circ$
 $W_2 = -51\text{J}$

⑨ $W_1 = F_1 d \cos \theta_1$
 $W_1 = 128\text{N}(12.0\text{m}) \cos 0^\circ$
 $W_1 = 1536\text{J}$
 $W_1 = 1540$

$W_2 = F_2 d \cos \theta_2$
 $W_2 = 210\text{N}(12.0\text{m}) \cos 149^\circ$
 $W_2 = -2160.06 \dots \text{J}$
 $W_2 = -2200\text{J}$

$W_3 = F_3 d \cos \theta_3$
 $W_3 = 99\text{N}(12.0\text{m}) \cos 154^\circ$
 $W_3 = -1067.767 \dots \text{J}$
 $W_3 = -1100\text{J}$

10. Same as above