

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

⑨. $W_1 = \vec{F}_{||} \vec{d}$
 $W_1 = 128\text{N}(12.0\text{m})$
 $W_1 = 1536\text{J}$
 $W_1 = 1540\text{J}$

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

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

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: $W = Fd \cos \theta$

$$\begin{aligned} \textcircled{1} \quad W &= Fd \cos \theta \\ W &= 45\text{N}(3.0\text{m}) \cos 0^\circ \\ W &= 135\text{J} \\ W &= 140\text{J} \end{aligned}$$

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

$$\begin{aligned} \textcircled{3} \quad W &= Fd \cos \theta \\ W &= 45\text{N}(3.0\text{m}) \cos 90^\circ \\ W &= 0\text{J} \end{aligned}$$

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

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

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

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

$$\begin{aligned} \textcircled{8} \quad W_1 &= F_1 d \cos \theta_1 \\ W_1 &= 17\text{N}(3.0\text{m}) \cos 0^\circ \\ W_1 &= 51\text{J} \end{aligned}$$

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

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

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

$$\begin{aligned} W_3 &= F_3 d \cos \theta_3 \\ W_3 &= 99\text{N}(12.0\text{m}) \cos 154^\circ \\ W_3 &= -1067.967 \dots \text{J} \\ W_3 &= -1100\text{J} \end{aligned}$$

10. Same as above