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a) $W_{123} = -167\ J$
$Q_{123} = +418\ J$

$\Delta U_{123} = Q_{123} + W_{123}$
$= 418\ J + (-167\ J)$

$\boxed{\Delta U_{123} = +251\ J}$

b) $W_{143} = -63\ J$
$\Delta U_{143} = \Delta U_{123} = +251\ J$

$\Delta U_{143} = Q_{143} + W_{143}$
$251\ J = Q_{143} + (-63\ J)$

$\boxed{Q_{143} = +314\ J}$

c) $W_{12} = W_{34} = 0$

$W_{123} = W_{12} + W_{23}$
$-167\ J = 0 + W_{23}$
$W_{23} = -167\ J$

$W_{143} = W_{14} + W_{43}$
$-63\ J = W_{14} + 0$
$W_{14} = -63\ J$ so $W_{41} = +63\ J$

$W_{12341} = W_{12} + W_{23} + W_{34} + W_{41}$
$= 0 + -167\ J + 0 + +63\ J$

$\boxed{W_{12341} = -104\ J}$

d) $W_{23} = -167\ J$ so $W_{32} = +167\ J$

$W_{14321} = W_{14} + W_{43} + W_{32} + W_{21}$
$= (-63\ J) + 0 + (+167\ J) + 0$

$\boxed{W_{14321} = +104\ J}$