Predicate logic translation exercise

Consider these proposed translations of the assertion, "all walkways are within rooms."

i. $\forall x(Kx \rightarrow \exists y(Ry \wedge Ixy))$ (Kx: x is a walkway; Rx: x is a room; Ixy: x is within y).
ii. $\forall x \exists y((Kx \wedge Ry) \rightarrow Ixy)$ (Kx: x is a walkway; Rx: x is a room; Ixy: x is within y).
iii. $\forall x \forall y((Kx \wedge Ixy) \rightarrow Ry)$ (Kx: x is a walkway; Rx: x is a room; Ixy: x is within y).
iv. $\forall x \forall y((Rx \wedge Iyx) \rightarrow Ky)$ (Kx: x is a walkway; Rx: x is a room; Ixy: x is within y).
v. $\exists y(Ry \wedge \forall x(Kx \rightarrow Ixy))$ (Kx: x is a walkway; Rx: x is a room; Ixy: x is within y).

Question 1: translation i vs. translation iii

Explain the difference between translations i and iii in your own words. Give an example of a situation that would falsify translation iii, but not translation i.

Question 2: translation iii vs. translation iv

Explain the difference between translations iv and iii in your own words. Give an example of a situation that would falsify translation iv, but not translation iii.

Question 3: translation i vs. translation v

Explain the difference between translations i and v in your own words. Give an example of a situation that would falsify translation v, but not translation i.

Question 4: translation 1 vs. translation ii

Explain the difference between translations i and ii in your own words. Give an example of a situation that would falsify translation i, but not translation ii.

Question 5: Best translations

Which of these five translations are plausible on some understanding of the assertion, "all walkways are within rooms." For each translation that is *not* plausible, explain in one sentence why it doesn't capture any meaning of the assertion.